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Mechanics Almanack

1842 -1844

THE

MECHANICS' ALMANACK

AND

ENGINEERS' YEAR BOOK

FOR

1842;

16.5.56

CONTAINING

A COMPLETE CALENDAR FOR THE YEAR,

With Astronomical and Historical Illustrations;

PROGRESS OF POPULAR INSTRUCTION;

SUNDAY SCHOOLS, MECHANICS' INSTITUTIONS, ETC.;

FREEDOM OF LABOUR;

EARLY SLAVERY OF THE WORKING CLASSES; LAW OF APPRENTICESHIP; LAW OF SETTLEMENT; EMIGRATION OF ARTISANS, ETC.;

RELATION BETWEEN WAGES AND PRICE OF FOOD;

EFFECT OF THE

RESTRICTIVE DUTIES ON CORN, SUGAR, WOOD, ETC.;

STATE OF MACHINE-MAKING AT HOME AND ABROAD;

Monopoly and Pauperism;

HISTORICAL MEMOIRS OF THE WOOLLEN, LINEN, SILK, AND COTTON TRADES;

NEW INVENTIONS, IMPROVEMENTS, AND DISCOVERIES;

LIST OF NEW PATENTS;

PREMIUMS FOR NEW INVENTIONS;

Progress of Steam Navigation;

NUMEROUS WORKSHOP TABLES AND RULES;

&c. &c. &c.

LONDON:

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BY A. SPOTTISWOODE, NEW-STREET-SQUARE;

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Price One Shilling.

CHRONOLOGICAL CYCLES, &c.		ECCLESIASTICAL FEASTS.			
Dominical Letter	B	Solar Cycle - -	3	Shrove Sun.	Feb. 6	Holy Thursd.	May 5
Golden Number -	19	No. of Direction	6	Midlent Sun.	Mar. 6	Whit Sund.	May 15
Epact - -	18	Julian Period	6555	Easter Day,	Mar. 27	Trinity Sund.	May 22
Sund. aft. Trinity -	26	Roman Indiction	15	Rogation Sun.	May 1	Advent Sund.	Nov. 27

ECLIPSES, &c., 1842.

Three of the Sun and *two* of the Moon.

I. *January* 11.—An *annular* Eclipse of the Sun, invisible in Great Britain.

II. *January* 26.—A *partial* and visible Eclipse of the Moon: Moon rises eclipsed in the afternoon at 4h. 33m.; Sun sets 4h. 37m.; middle of the eclipse 5h. 44m.; end 7h. 10m.

III. *July* 8.—A *total* and visible Eclipse of the Sun, to be seen principally in Asia. In this country the eclipse will be partial: Sun rises in the morning at 3h. 55m.; eclipse begins at 4h. 54m.; greatest darkness 5h. 47m.; ends at 6h. 43m.

IV. *July* 22.—A *partial* Eclipse of the Moon, invisible to this country.

V. *December* 31.—An *annular* Eclipse of the Sun, also invisible here.

Mercury may be seen in the evenings, near the western horizon, soon after sunsetting, about *Feb.* 14., *June* 12., and *Oct.* 7.; and in the mornings, shortly before sunrising, about *Mar.* 30., *July* 28., and *Nov.* 16.

For the other planets, see the astronomical memoranda, each month.

*** SPRING commences March the 21st, at 0 h. 14 m. morning.
SUMMER ——— June the 21st, at 9h. 22 m. afternoon.
AUTUMN ——— Sept. the 23d, at 11 h. 26 m. morning
WINTER ——— Dec. the 22d, at 4 h. 56 m. morning.

TABLE, showing the Illuminated Appearances of Venus and Mars.

Date.	Venus.	Mars.
Jan. 15	0·980	0·941
Feb 14	0·997	0·960
Mar. 15	0·999	0·975
Apr. 15	0·984	0·987
May 15	0·950	0·996
June 15	0·894	1·000
July 15	0·813	0·999
Aug. 15	0·716	0·993
Sept. 15	0·599	0·982
Oct. 15	0·455	0·967
Nov. 15	0·240	0·948
Dec. 15	0·005	0·928

The numbers given in this Table represent the versed sines of the illuminated portion of the Discs, the apparent Diameters of the Planets being considered as *unity*. These being traced and compared by observations on the planets with good telescopes, serve remarkably to confirm the truth of the solar system to young astronomers.

LAW TERMS for the YEAR 1842.

1. HILARY TERM *begins* Jan. 11., *ends* Jan. 31.; and *contains* 21 days.
2. EASTER TERM *begins* April 15., *ends* May 9.; and *contains* 25 days.
3. TRINITY TERM *begins* May 23., *ends* June 13.; and *contains* 22 days.
4. MICHAELMAS TERM *begins* Nov. 2., *ends* Nov. 25.; and *contains* 24 days.

*** By the stat. 1 Will. IV. cap. 3. sec. 2., it is enacted that all writs usually returnable before any of His Majesty's Courts of King's Bench, Common Pleas, and Exchequer respectively, on general Return Days, might, after the First day of *January*, 1831, be made returnable on the Third day exclusive before the commencement of each Term, or on any day, not being *Sunday*, between that day and the third day exclusive before the last day of the Term; and that the day for appearance should, as theretofore, be the Third day after the Return, exclusive of the Return day; or, in case such Third day should fall on a *Sunday*, then on the Fourth day after such Return, exclusive of the Return day. All other writs must, as before, be made returnable on a day in full Term.

[PRINTED FOR THE COMPANY OF STATIONERS.]

MOON'S QUARTERS.

☾ Last Quarter, 3d day, at 10 h. 8 m. afternoon.
● New Moon, 11th day, at 4 h. 15 m. afternoon.
☽ First Quarter, 19th day, at 9 h. 0 m. afternoon.
○ Full Moon, 26th day, at 5 h. 50 m. afternoon.

☉ enters ♒ 20th day, at 9 h. 31 m. morning.

Day.	Time on Clock at Sun's noon. h	m	s	Sun's Dec. °	′	
1	12	3	51	23	S.	2
7	12	6	35	22		24
13	12	9	1	21		30
19	12	11	4	20		22
25	12	12	46	18		59

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises.		Sets.		High Water, London Bridge. Morn.		Aftern.	
			VIII	IV.	h	m	h	m	h	m	h	m
1	S	Circumcision	8	0	10 a	6	10 m	17	4	48	5	5
2	Sun	2 Sun. aft. Christ.	8	0	11	29	10	32	5	24	5	44
3	M	Saturn rises 7 40 morn.	8	1	morn.		10	48	6	7	6	32
4	Tu	Jupiter rises 7 29 morn.	8	2	0	30	11	5	6	59	7	29
5	W		8	4	2	10	11	23	8	1	8	35
6	Th	Epiphany. 12th Day.	7	5	3	29	11	46	9	9	9	42
7	F		7	7	4	43	0 a	17	10	14	10	46
8	S	Lucian.	7	8	5	52	0	57	11	17	11	47
9	Sun	1 Sun. aft. Epiph.	6	9	6	50	1	49	—	—	0	15
10	M	Plough Monday	6	10	7	35	2	51	0	41	1	6
11	Tu	Hilary Term begins	5	11	8	9	3	59	1	31	1	55
12	W	Mars sets 8 10 aft.	5	13	8	35	5	10	2	16	2	35
13	Th	Hil. Cam. T. begins	4	14	8	58	6	21	2	58	3	11
14	F	Oxford Term begins	3	16	9	9	7	30	3	28	3	44
15	S		2	18	9	22	8	39	3	59	4	15
16	Sun	2 Sun. aft. Epiph.	1	19	9	35	9	48	4	31	4	47
17	M	Venus rises 7 24 morn.	0	20	9	47	10	57	5	4	5	21
18	Tu	Prisca	VII	22	10	0	morn.		5	40	6	0
19	W		58	21	10	16	0	8	6	20	6	42
20	Th	Fabian	57	23	10	36	1	24	7	8	7	37
21	F	Agnes	57	27	11	2	2	41	8	9	8	43
22	S	Vincent	55	29	11	38	3	59	9	21	10	1
23	Sun	Septuagesima Sunday	53	31	0 a	28	5	12	10	41	11	20
24	M	Mercury sets 4 50 aft.	51	33	1	36	6	13	11	57	—	—
25	Tu	Convers. of St. Paul	50	35	3	1	7	0	0	32	1	4
26	W	☾ eclipsed and visible	49	37	4	33	7	35	1	34	2	0
27	Th	Duke of Sussex born	48	38	6	6	7	59	2	24	2	46
28	F		46	40	7	38	8	19	3	7	3	28
29	S	[Char. I. mart.	45	42	9	5	8	38	3	45	4	3
30	Sun	Sexagesima Sunday. K.	44	44	10	31	8	51	4	21	4	41
31	M	Hilary Term ends	42	46	11	54	9	10	5	1	5	21

ASTRONOMICAL MEMORANDA.

9th day, Venus and Jupiter in conjunction.
10th — Venus, Jupiter, and Saturn in conjunction with the Moon.
11th — Sun eclipsed, invisible.
17th — Mercury in superior conjunction with the Sun.
25th — Jupiter and Saturn in conjunction: near to each other all the year.
26th — Moon partially eclipsed, visible.

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MOON'S QUARTERS.

☾ Last Quarter, 2d day, at 10 h. 26 m. morning.
● New Moon, 10th day, at 11 h. 54 m. morning.
☽ First Quarter, 18th day, at 11 h. 41 m. morning.
○ Full Moon, 25th day, at 4 h. 15 m. morning.

☉ enters ♓ 19th day, at 0 h. 13 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	13	55	17 S.	8
7	12	14	29	15	20
13	12	14	33	13	23
19	12	14	10	11	18
25	12	13	23	9	7

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VII	IV								
1	Tu	Saturn rises 3 58 morn.	41	47	morn.		9	m 28	5	44	6	11
2	W	Purif. Cand. Day	39	49	1	15	9	51	6	40	7	10
3	Th	Blaise	37	51	2	34	10	20	7	42	8	16
4	F		36	52	3	44	10	56	8	50	9	20
5	S	Agatha	34	54	4	45	11	44	9	49	10	18
6	Sun	Shrove Sunday	32	56	5	34	0	a 43	10	47	11	17
7	M	Jupiter rises 5 45 morn.	31	58	6	11	1	48	11	46	—	—
8	Tu	Shrove Tuesday	30	v	6	40	2	58	0	12	0	37
9	W	Lent begins Ash Wed.	28	2	7	0	4	9	1	2	1	25
10	Th	Queen Vict. married	26	4	7	17	5	19	1	45	2	4
11	F		24	6	7	32	6	29	2	22	2	40
12	S	Mars sets 8 26 aft.	22	8	7	44	7	37	2	56	3	12
13	Sun	1 Sunday in Lent	21	9	7	56	8	46	3	28	3	44
14	M	Valentine	19	11	8	8	9	56	3	59	4	15
15	Tu	Venus rises 7 14 morn.	16	12	8	22	11	9	4	33	4	52
16	W	Ember Week	14	14	8	39	morn.		5	12	5	34
17	Th		12	16	9	3	0	24	5	58	6	23
18	F	Mercury sets 7 2 aft.	10	18	9	33	1	39	6	49	7	18
19	S	Saturn rises 4 55 morn.	9	19	10	15	2	52	7	50	8	25
20	Sun	2 Sunday in Lent	7	21	11	15	3	57	9	2	9	41
21	M	Jupiter rises 5 0 morn.	5	23	0	a 29	4	49	10	21	11	0
22	Tu	Mars sets 8 30 aft.	3	25	1	56	5	29	11	39	—	—
23	W	Venus rises 7 5 morn.	1	27	3	27	5	58	0	15	0	46
24	Th	St. Matth. D. Cam. B.	VI	29	5	1	6	22	1	13	1	39
25	F	Mercury sets 6 44 aft.	56	30	6	29	6	39	2	2	2	23
26	S		54	32	7	58	6	57	2	43	3	2
27	Sun	3 Sunday in Lent	52	34	9	26	7	14	3	21	3	40
28	M		50	36	10	52	7	33	3	59	4	19

ASTRONOMICAL MEMORANDA.

7th day, Saturn and Jupiter in conjunction with the Moon.
9th — Venus in conjunction with the Moon.
13th — Mars in conjunction with the Moon.

Jupiter will be a *Morning Star* until July 11th, then an *Evening Star* for the remainder of the year.
Venus will be a *Morning Star* until February 16th, then an *Evening Star* until December 18th, and a *Morning Star* to the end of the year.

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MOON'S QUARTERS.

☾ Last Quarter, 4th day, at 1 h. 22 m. morning.
● New Moon, 12th day, at 6 h. 29 m. morning.
☽ First Quarter, 19th day, at 10 h. 42 m. afternoon.
○ Full Moon, 26th day, at 1 h. 57 m. afternoon.

☉ enters ♈ 21st day, at 0 h. 14 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	12	39	7 S.	57
7	12	11	19	5	19
13	12	9	45	2	58
19	12	8	1	0	36
25	12	6	11	1 N.	46

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	V								
1	Tu	David	48	38	morn.		7 m	54	4	41	5	4
2	W	Chad	45	39	0	14	8	20	5	29	5	56
3	Th	Saturn rises 4 10 morn.	43	41	1	31	8	55	6	24	6	53
4	F	Jupiter rises 4 24 morn.	42	42	2	37	9	40	7	23	7	57
5	S		40	44	3	32	10	36	8	30	8	59
6	Sun	4TH, OR MIDLENT SUN.	37	46	4	12	11	40	9	27	9	54
7	M	Perpetua	35	47	4	43	0 a	47	10	20	10	46
8	Tu	Mars sets 8 34 aft.	33	49	5	6	1	58	11	12	11	38
9	W	Venus sets 5 52 aft.	31	51	5	23	3	9	—	—	0	4
10	Th	Mercury rises 5 49 morn.	29	53	5	38	4	18	0	27	0	49
11	F		26	55	5	53	5	27	1	10	1	29
12	S	Gregory	23	57	6	5	6	36	1	47	2	5
13	Sun	5 SUNDAY IN LENT	21	59	6	18	7	46	2	23	2	40
14	M	Saturn rises 3 29 morn.	18	VI	6	32	8	59	2	57	3	15
15	Tu	Jupiter rises 3 47 morn.	16	2	6	49	10	13	3	33	3	51
16	W	Mars sets 8 37 aft.	14	4	7	9	11	27	4	10	4	31
17	Th	St. Patrick [Term ends	12	6	7	38	morn.		4	53	5	16
18	F	Edw. K. W. Saxons. Cam.	9	7	8	15	0	41	5	42	6	9
19	S	Oxford Term ends	7	9	9	5	1	48	6	37	7	7
20	Sun	PALM SUNDAY.	5	11	10	12	2	43	7	38	8	11
21	M	Benedict	2	12	11	30	3	26	8	47	9	24
22	Tu		0	14	0 a	56	3	58	10	3	10	41
23	W	Venus sets 6 38 aft.	v	16	2	26	4	22	11	18	11	53
24	Th	Maundy Thursday	56	18	3	56	4	43	—	—	0	23
25	F	GOOD FRIDAY. ANNUNC.	53	19	5	23	5	1	0	49	1	13
26	S	[OR LADY-DAY	51	21	6	52	5	17	1	36	1	57
27	Sun	EASTER DAY	49	23	8	19	5	35	2	17	2	37
28	M	EASTER MONDAY	46	24	9	45	5	55	2	57	3	18
29	Tu	EASTER TUESDAY	44	26	11	7	6	20	3	39	4	1
30	W		42	28	morn.		6	52	4	23	4	46
31	Th		39	29	0	20	7	33	5	11	5	38

ASTRONOMICAL MEMORANDA.

3d day, Mercury in inferior conjunction with the Sun.
5th — Venus in superior conjunction with the Sun.
6th — Saturn and Jupiter in conjunction with the Moon.
12th — Venus in conjunction with the Moon.
14th — Mars in conjunction with the Moon.
21st — Spring commences.

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MOON'S QUARTERS.

☾ Last Quarter, 2d day, at 6 h. 30 m. afternoon.
● New Moon, 10th day, at 10 h. 31 m. afternoon.
☽ First Quarter, 18th day, at 6 h. 32 m. morning.
○ Full Moon, 24th day, at 11 h. 28 m. afternoon.

☉ enters ♉ 20th day, at 0 h. 30 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	4	1	4 N.	30
7	12	2	14	6	47
13	12	0	35	9	0
19	11	59	8	11	8
25	11	57	54	13	9

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			V	VI								
1	F	Saturn rises 2 23 morn.	37	31	1	m 22	8	m 27	6	6	6	34
2	S		35	32	2	8	9	29	7	1	7	28
3	Sun	1st, or Low Sunday	32	34	2	44	10	36	7	55	8	24
4	M	St. Ambrose	31	35	3	9	11	47	8	52	9	18
5	Tu	[T. beg.	29	37	3	29	0 a	56	9	42	10	6
6	W	Old L. D. Oxf. and Cam.	27	39	3	45	2	6	10	31	10	57
7	Th		24	40	3	59	3	15	11	23	11	48
8	F	Jupiter rises 2 24 morn.	22	42	4	12	4	24	—	—	0	12
9	S	Mars sets 8 44 aft.	20	44	4	26	5	33	0	33	0	53
10	Sun	2 Sun. aft. Easter	18	45	4	40	6	45	1	13	1	33
11	M		15	47	4	56	8	1	1	53	2	12
12	Tu	Venus sets 7 41 aft.	13	49	5	16	9	15	2	32	2	52
13	W	Mercury rises 4 45 morn.	11	51	5	41	10	30	3	12	3	32
14	Th		8	52	6	16	11	40	3	52	4	14
15	F	Easter Term begins	6	54	7	4	morn.		4	38	5	4
16	S	Saturn rises 1 26 morn.	4	56	8	4	0	38	5	30	5	56
17	Sun	3 Sun. aft. Easter	2	58	9	20	1	24	6	23	6	50
18	M	Jupiter rises 1 47 morn.	0	59	10	40	1	59	7	18	7	48
19	Tu	Alphege	IV	VII	0 a	6	2	25	8	22	8	59
20	W		56	2	1	31	2	45	9	37	10	15
21	Th	Mars sets 8 46 aft.	54	4	2	57	3	3	10	51	11	24
22	F	Venus sets 8 13 aft.	51	5	4	22	3	20	11	54	—	—
23	S	St. George	49	7	5	48	3	38	0	22	0	46
24	Sun	4 Sun. aft. Easter	48	8	7	14	3	57	1	9	1	31
25	M	St. Mark. Ds. Gloc. bo.	46	10	8	39	4	20	1	53	2	16
26	Tu	Mercury rises 4 28 morn.	44	12	9	57	4	47	2	38	3	0
27	W		42	14	11	5	5	26	3	21	3	43
28	Th		39	15	12	0	6	14	4	5	4	28
29	F		37	17	morn.		7	15	4	52	5	16
30	S		36	18	0	39	8	21	5	40	6	4

ASTRONOMICAL MEMORANDA.

2d day, Saturn in conjunction with the Moon.
3d — Jupiter in conjunction with the Moon.
11th — Venus in conjunction with the Moon.
12th — Mars in conjunction with the Moon.
30th — Saturn and Jupiter in conjunction with the Moon.

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MOON'S QUARTERS.

☾ Last Quarter, 2d day, at 0 h. 46 m. afternoon.
● New Moon, 10th day, at 11 h. 38 m. morning.
☽ First Quarter, 17th day, at 0 h. 10 m. afternoon.
○ Full Moon, 24th day, at 9 h. 39 m. morning.

☉ enters ♊ 21st day, at 0 h. 45 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	56	58	15 N.	2
7	11	56	21	16	47
13	11	56	6	18	21
19	11	56	10	19	45
25	11	56	34	20	56

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			IV	VII								
1	Sun	5TH, OR ROGATION SUN.	34	20	1 m	10	9 m	32	6	27	6	49
2	M	St. Phil. and St. James	32	22	1	32	10	43	7	11	7	34
3	Tu	Inven. of the Cross	31	23	1	49	11	53	7	59	8	25
4	W	Saturn rises 0 14 morn.	29	25	2	5	1 a	1	8	52	9	17
5	Th	ASCENSION. HOLY TH.	27	26	2	17	2	9	9	42	10	8
6	F	Jn. Evan. à P. Lat.	25	27	2	32	3	17	10	35	11	2
7	S		23	29	2	46	4	29	11	29	11	54
8	Sun	SUN. AFT. ASCENSION	22	30	3	0	5	43	—	—	0	18
9	M	Easter Term ends	20	32	3	19	6	58	0	41	1	3
10	Tu	Jupiter rises 0 22 morn.	18	34	3	45	8	14	1	26	1	50
11	W	Mars sets 8 48 aft.	17	35	4	16	9	27	2	13	2	35
12	Th	Venus sets 9 15 aft.	15	37	5	0	10	31	2	57	3	20
13	F	Old May Day	14	38	5	59	11	22	3	43	4	7
14	S	Oxford Term ends	12	40	7	9	11	58	4	30	4	53
15	Sun	WHIT-SUNDAY	10	42	8	30	morn.		5	15	5	38
16	M	WHIT-MONDAY	9	43	9	54	0	28	6	1	6	25
17	Tu	WHIT-TUESDAY	7	45	11	18	0	50	6	51	7	18
18	W	EMBER W. Oxf. T. beg.	6	46	0 a	41	1	9	7	47	8	19
19	Th	Dunstan	4	48	2	4	1	26	8	57	9	36
20	F	Mercury sets 9 0 aft.	3	49	3	28	1	42	10	14	10	50
21	S		2	50	4	52	2	0	11	22	11	52
22	Sun	TRIN. SUNDAY.	1	51	6	14	2	20	—	—	0	19
23	M	Trinity Term begins.	III	53	7	35	2	46	0	45	1	9
24	Tu	QUEEN VICTORIA BORN	58	55	8	47	3	20	1	33	1	57
25	W		57	57	9	46	4	3	2	20	2	42
26	Th	Corpus Christi	56	58	10	33	4	59	3	4	3	26
27	F	Venerable Bede	55	59	11	8	6	5	3	47	4	8
28	S		54	VIII	11	33	7	14	4	28	4	49
29	Sun	1 SUN. AFT. TRIN. K. CH.	53	1	11	53	8	26	5	9	5	29
30	M	[H. REST. 1660.	52	2	morn.		9	37	5	48	6	7
31	Tu		52	3	0	8	10	45	6	26	6	46

ASTRONOMICAL MEMORANDA.

2d day, Venus in conjunction with Mars.
10th — Mercury in superior conjunction with the Sun.
11th — Mars and Venus in conjunction with the Moon.
27th — Saturn in conjunction with the Moon.
28th — Jupiter in conjunction with the Moon.

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MOON'S QUARTERS.

☾ Last Quarter, 1st day, at 6 h. 51 m. morning.
● New Moon, 8th day, at 10 h. 14 m. afternoon.
☽ First Quarter, 15th day, at 4 h. 52 m. afternoon.
○ Full Moon, 22d day, at 9 h. 22 m. afternoon.
☾ Last Quarter, 30th day, at 11 h. 41 m. afternoon.

☉ enters ♋ 21st day, at 9 h. 22 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	57	25	22 N.	3
7	11	58	25	22	45
13	11	59	35	23	13
19	12	0	52	23	26
25	12	2	9	23	25

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge, Morn. h	m	Aftern. h	m
			III	VIII								
1	W	Nicomede	51	4	0	m 24	11	m 55	7	7	7	27
2	Th	Saturn rises 10 12 aft.	51	5	0	37	1	a 3	7	49	8	15
3	F	Jupiter rises 10 42 aft.	50	6	0	51	2	12	8	43	9	12
4	S		49	7	1	4	3	23	9	42	10	13
5	Sun	2 Sun. aft. Trin. K. of	48	8	1	21	4	37	10	44	11	15
6	M	[Han. b. Bonif.	47	9	1	44	5	53	11	46	—	—
7	Tu		47	10	2	13	7	9	0	14	0	41
8	W	Mars sets 8 40 aft.	47	11	2	52	8	19	1	8	1	35
9	Th	Venus sets 10 9 aft.	46	12	3	45	9	15	2	5	2	25
10	F	Mercury sets 10 7 aft.	46	12	4	54	9	59	2	49	3	12
11	S	St. Barnabas	45	13	6	15	10	31	3	34	3	56
12	Sun	3 Sun. after Trin.	45	13	7	38	10	55	4	17	4	38
13	M	Trinity Term ends	45	14	9	5	11	15	4	57	5	15
14	Tu	Saturn rises 9 22 aft.	44	15	10	30	11	32	5	35	5	56
15	W	Jupiter rises 9 52 aft.	44	16	11	53	11	49	6	20	6	46
16	Th		44	16	1	a 15	morn.		7	15	7	46
17	F	St. Alban	44	17	2	36	0	7	8	21	8	58
18	S	Mars sets 8 32 aft.	44	18	4	0	0	25	9	38	10	17
19	Sun	4 Sun. aft. Trinity	44	18	5	19	0	49	10	53	11	26
20	M	Queen Victoria acc.	44	18	6	32	1	18	11	56	—	—
21	Tu	Qu. Vict. proc. Longest	44	18	7	38	1	57	0	24	0	50
22	W	[Day	45	19	8	29	2	48	1	15	1	39
23	Th	Venus sets 10 9 aft.	45	19	9	7	3	50	2	3	2	25
24	F	Nat. J. Bapt. Mids. Day	45	19	9	36	4	58	2	46	3	5
25	S	Mercury sets 9 12 aft.	46	19	9	58	6	10	3	24	3	42
26	Sun	5 Sun. aft. Trinity	46	19	10	15	7	22	4	0	4	17
27	M		47	19	10	30	8	31	4	34	4	50
28	Tu	Qu. Victoria cor.	47	19	10	44	9	39	5	7	5	24
29	W	St. Peter	48	18	10	56	10	47	5	41	5	58
30	Th		48	18	11	10	11	55	6	17	6	38

ASTRONOMICAL MEMORANDA.

9th day, Mars in conjunction with the Moon.
10th — Venus in conjunction with the Moon.
21st — Summer commences.
23d — Saturn in conjunction with the Moon.
24th — Jupiter in conjunction with the Moon.
25th — Mars in conjunction with the Sun.

[PRINTED FOR THE COMPANY OF STATIONERS.]

MOON'S QUARTERS.

New Moon, 8th day, at 7 h. 1 m. morning.
First Quarter, 14th day, at 10 h. 5 m. afternoon.
Full Moon, 22d day, at 10 h. 57 m. morning.
Last Quarter, 30th day, at 2 h. 42 m. afternoon.

☉ enters ♌ 23d day, at 8 h. 18 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	3	40	23 N.	9
7	12	4	27	22	38
13	12	5	19	21	53
19	12	5	54	20	54
25	12	6	9	19	43

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises.		Sets.		High Water, London Bridge. Morn.		Aftern.	
			III VIII		h	m	h	m	h	m	h	m
1	F		49	18	11 a	26	1 a	6	7	0	7	24
2	S	Visitation B. V. M.	50	18	11	45	2	18	7	50	8	21
3	Sun	6 Sun. aft. Trin. Dog.	51	17	morn.		3	32	8	54	9	28
4	M	Trans. St. Mart. [D. beg.	51	17	0	11	4	46	10	2	10	36
5	Tu	Oxf. Act. Cam. com.	52	16	0	45	5	58	11	11	11	47
6	W	Old Midsummer Day.	53	15	1	30	7	2	—	—	0	21
7	Th	Thomas à Becket	54	15	2	33	7	52	0	52	1	21
8	F	Cambridge Term ends.	55	15	3	49	8	31	1	49	2	16
9	S	Oxf. Term ends [ec. vis.	56	14	5	14	8	57	2	40	3	1
10	Sun	7 Sun. aft. Trinity	57	13	6	43	9	20	3	21	3	41
11	M		58	12	8	11	9	39	4	0	4	19
12	Tu	Saturn sets 3 27 morn.	59	11	9	36	9	56	4	39	4	58
13	W	Jupiter sets 3 52 morn.	1v	10	11	2	10	13	5	16	5	36
14	Th	Mars rises 3 27 morn.	1	9	0 a	26	10	31	6	0	6	26
15	F	St. Swithin	2	9	1	47	10	53	6	58	7	22
16	S		3	9	3	7	11	20	7	57	8	34
17	Sun	8 Sun. aft. Trinity	4	8	4	23	11	55	9	12	9	49
18	M	Venus sets 9 37 aft.	5	7	5	31	morn.		10	25	10	59
19	Tu	Mercury rises 3 18 morn.	7	5	6	25	0	42	11	32	—	—
20	W	Margaret	8	4	7	7	1	39	0	2	0	29
21	Th		9	3	7	39	2	46	0	54	1	19
22	F	Magdalene	11	1	8	3	3	56	1	42	2	3
23	S	Saturn sets 2 40 morn.	12	0	8	22	5	8	2	22	2	41
24	Sun	9 Sun. aft. Trinity	13	vii	8	37	6	17	2	58	3	14
25	M	St. Jas. Ds. Camb. e.	15	57	8	50	7	26	3	29	3	45
26	Tu	St. Anne	16	56	9	3	8	34	4	1	4	17
27	W	Jupiter sets 2 48 morn.	17	55	9	17	9	42	4	33	4	49
28	Th	Mars rises 3 20 morn.	19	53	9	31	10	49	5	5	5	23
29	F	Venus sets 9 14 morn.	20	52	9	49	11	59	5	42	6	2
30	S		22	50	10	10	1 a	13	6	24	6	47
31	Sun	10 Sun. aft. Trinity	24	48	10	40	2	26	7	13	7	44

ASTRONOMICAL MEMORANDA.

3d day, Saturn in opposition to the Sun; Sun in Apogee.
8th — Sun eclipsed, visible; Mars in conjunction with the Moon; Mercury in inferior conjunction with the Sun.
10th — Jupiter in opposition; Venus in conjunction with the Moon.
20th — Saturn in conjunction with the Moon.
21st — Jupiter in conjunction with the Moon.
22d — Moon eclipsed, invisible.

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MOON'S QUARTERS.

●	New Moon,	6th day, at	2 h. 45 m. afternoon.
☽	First Quarter,	15th day, at	5 h. 22 m. morning.
○	Full Moon,	21st day, at	2 h. 14 m. morning.
☾	Last Quarter,	29th day, at	3 h. 49 m. morning.

☉ enters ♍ 23d day, at 2 h. 48 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	6	0	18 N.	5
7	12	5	30	16	30
13	12	4	38	14	45
19	12	3	26	12	51
25	12	1	57	10	50

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			IV	VII								
1	M	Lammas Day	25	47	11 a	18	3 a	40	8	19	8	55
2	Tu	Saturn sets 1 57 morn.	27	45	morn.		4	46	9	32	10	10
3	W	Jupiter sets 2 17 morn.	28	44	0	11	5	41	10	48	11	27
4	Th	Mars rises 3 18 morn.	30	42	1	20	6	24	—	—	0	4
5	F		32	40	2	41	6	57	0	36	1	6
6	S	Transfiguration	33	39	4	9	7	22	1	34	2	0
7	Sun	11 Sun. aft. Trinity	35	37	5	41	7	43	2	23	2	44
8	M		36	35	7	10	8	1	3	3	3	22
9	Tu	Venus sets 8 51 aft.	37	33	8	38	8	19	3	40	3	59
10	W	St. Lawrence	39	31	10	5	8	37	4	18	4	38
11	Th	Dog Days end	40	30	11	31	8	58	4	59	5	21
12	F	[Day.	42	28	0 a	55	9	25	5	46	6	13
13	S	Qu. Dow. b. Old Lam.	43	26	2	13	9	57	6	41	7	11
14	Sun	12 Sun. aft. Trinity	44	24	3	24	10	40	7	45	8	21
15	M	Assumption	46	22	4	23	11	54	8	57	9	31
16	Tu		48	20	5	7	morn.		10	2	10	32
17	W	Duchess of Kent b.	50	18	5	42	0	37	11	4	11	35
18	Th		52	16	6	8	1	46	—	—	0	2
19	F	Mercury rises 4 20 morn.	53	14	6	28	2	57	0	27	0	50
20	S		54	12	6	44	4	8	1	12	1	33
21	Sun	13 Sun. aft. Trinity	56	10	7	0	5	16	1	52	2	9
22	M		58	8	7	12	6	25	2	26	2	42
23	Tu		59	5	7	25	7	32	2	58	3	13
24	W	St. Bartholomew	v	3	7	40	8	39	3	28	3	45
25	Th		3	1	7	55	9	48	4	2	4	19
26	F	Prince Albert born	4	0	8	15	10	59	4	36	4	55
27	S		5	VI	8	42	0 a	11	5	15	5	38
28	Sun	14 S. aft. Tr. St. Aug.	7	55	9	15	1	22	6	2	6	27
29	M	St. John Baptist bch.	8	53	10	0	2	29	6	54	7	24
30	Tu		10	50	11	0	3	29	7	56	8	33
31	W		12	48	morn.		4	16	9	11	9	50

ASTRONOMICAL MEMORANDA.

5th day, Mars in conjunction with the Moon.
9th — Venus in conjunction with the Moon.
16th — Saturn in conjunction with the Moon.
17th — Jupiter in conjunction with the Moon.
23d — Mercury in superior conjunction with the Sun.

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MOON'S QUARTERS.

● New Moon, 4th day, at 10 h. 15 m. afternoon.
☽ First Quarter, 11th day, at 3 h. 58 m. afternoon.
○ Full Moon, 19th day, at 6 h. 54 m. afternoon.
☾ Last Quarter, 27th day, at 3 h. 5 m. afternoon.

☉ enters ♎ 23d day, at 11 h. 26 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	59	54	8 N.	21
7	11	57	58	6	8
13	11	55	55	3	52
19	11	53	48	1	33
25	11	51	42	0 S.	47

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			V	VI								
1	Th	Giles	14	46	0m	13	4 a	52	10	28	11	6
2	F	London burnt, 1666, O. S.	16	44	1	37	5	21	11	42	—	—
3	S		17	41	3	6	5	43	0	15	0	46
4	Sun	15 Sun. aft. Trinity	19	39	4	36	6	3	1	13	1	39
5	M	Old Bartholomew	21	37	6	6	6	22	2	1	2	21
6	Tu		22	35	7	35	6	40	2	41	3	1
7	W	Enurchus	23	33	9	4	7	1	3	20	3	39
8	Th	Nativity B. V. M.	25	31	10	31	7	27	3	59	4	21
9	F	Saturn sets 11 17 aft.	26	28	11	55	7	57	4	44	5	9
10	S		28	26	1 a	11	8	38	5	35	6	2
11	Sun	16 Sun. aft. Trinity	30	24	2	15	9	29	6	32	7	3
12	M		31	21	3	6	10	30	7	33	8	3
13	Tu	Jupiter sets 11 22 aft.	33	19	3	44	11	36	8	36	9	8
14	W	Holy Cross	34	17	4	12	morn.		9	36	10	8
15	Th		35	15	4	34	0	47	10	30	10	57
16	F	Mars rises 3 6 morn.	37	13	4	52	1	57	11	24	11	50
17	S	Lambert	38	10	5	7	3	7	—	—	0	13
18	Sun	17 Sun. aft. Trinity	40	8	5	21	4	14	0	34	0	54
19	M		42	6	5	34	5	22	1	14	1	33
20	Tu	Venus sets 7 11 aft.	43	3	5	48	6	29	1	52	2	9
21	W	St. Matthew. Ember	45	1	6	3	7	39	2	26	2	43
22	Th	[Week	47	v	6	22	8	49	3	0	3	18
23	F	Mercury sets 6 25 aft.	48	56	6	46	10	1	3	36	3	55
24	S		50	54	7	16	11	11	4	15	4	35
25	Sun	18 Sun. aft. Trinity	52	52	7	56	0 a	18	4	57	5	22
26	M	St. Cyprian	53	49	8	50	1	19	5	48	6	13
27	Tu		55	47	9	57	2	9	6	40	7	10
28	W	[mas Day	57	45	11	13	2	49	7	41	8	14
29	Th	St. Michael. Michael-	58	42	morn.		3	20	8	48	9	24
30	F	St. Jerome	60	40	0	37	3	44	10	2	10	40

ASTRONOMICAL MEMORANDA.

3d — Mars in conjunction with the Moon.
8th — Venus in conjunction with the Moon.
9th — Jupiter stationary. 12th day, Saturn stationary.
13th — Saturn and Jupiter in conjunction with the Moon.
19th — Herschel in opposition to the Sun.
23d — Autumn commences.

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MOON'S QUARTERS.

New Moon, 4th day, at 6 h. 24 m. morning.
First Quarter, 11th day, at 6 h. 41 m. morning.
Full Moon, 19th day, at 11 h. 12 m. morning.
Last Quarter, 27th day, at 0 h. 41 m. morning.

☉ enters ♏ 23d day, at 7 h. 38 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	49	43	3 S.	8
7	11	47	55	5	27
13	11	46	21	7	44
19	11	45	5	9	57
25	11	44	12	12	4

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	V								
1	S	Remigius	2	38	2 m	3	4 a	5	11	17	11	51
2	Sun	19 Sun. aft. Trinity	3	35	3	32	4	25	—	—	0	22
3	M	Old St. Matthew	5	33	4	59	4	42	0	49	1	13
4	Tu	Saturn sets 9 41 aft.	7	30	6	28	5	3	1	36	1	57
5	W		8	28	7	57	5	27	2	18	2	39
6	Th	Faith	10	26	9	26	5	56	3	0	3	22
7	F	Jupiter sets 9 53 aft.	12	24	10	48	6	33	3	44	4	6
8	S	[Denys	14	22	11	59	7	21	4	29	4	54
9	Sun	20 Sun. aft. Trinity. St.	15	19	0 a	58	8	20	5	20	5	46
10	M	Oxf. & Cam. Terms beg.	17	17	1	41	9	26	6	13	6	40
11	Tu	Old Michaelmas Day	19	15	2	14	10	36	7	7	7	34
12	W	Mars rises 2 57 morn.	21	13	2	38	11	47	8	2	8	29
13	Th	Trans. K. Edw. Conf.	22	10	2	57	morn.		8	56	9	23
14	F	Venus sets 6 27 aft.	24	8	3	13	0	56	9	49	10	14
15	S		26	6	3	28	2	4	10	40	11	5
16	Sun	21 Sun. aft. Trinity	27	4	3	41	3	13	11	29	11	52
17	M	Etheldreda	28	2	3	56	4	20	—	—	0	14
18	Tu	St. Luke	30	0	4	11	5	28	0	35	0	56
19	W	Mercury sets 5 19 aft.	32	IV	4	30	6	38	1	16	1	36
20	Th		34	56	4	52	7	48	1	55	2	15
21	F	Saturn sets 8 38 aft.	36	54	5	21	9	0	2	36	2	56
22	S	Jupiter sets 9 2 aft.	38	52	5	59	10	9	3	16	3	38
23	Sun	22 Sun. aft. Trinity	39	50	6	48	11	12	4	0	4	22
24	M		40	48	7	50	0 a	6	4	44	5	9
25	Tu	Crispin	42	46	9	2	0	48	5	35	5	59
26	W	Mars rises 2 51 morn.	45	43	10	20	1	22	6	23	6	48
27	Th	Venus sets 6 11 aft.	47	41	11	43	1	46	7	15	7	45
28	F	St. Simon and St. Jude	49	39	morn.		2	7	8	17	8	52
29	S		51	37	1	7	2	27	9	28	10	5
30	Sun	23 Sun. aft. Trinity	52	36	2	30	2	45	10	42	11	17
31	M		54	34	3	57	3	4	11	49	—	—

ASTRONOMICAL MEMORANDA.

2d day, Mars in conjunction with the Moon.
7th — Venus in conjunction with the Moon.
10th — Saturn in conjunction with the Moon.
11th — Jupiter in conjunction with the Moon.
30th — Mars in conjunction with the Moon.
31st — Mercury in inferior conjunction with the Sun.

[PRINTED FOR THE COMPANY OF STATIONERS.]

MOON'S QUARTERS.

● New Moon, 2d day, at 4 h. 8 m. afternoon.
☽ First Quarter, 10th day, at 1 h. 15 m. morning.
○ Full Moon, 18th day, at 3 h. 29 m. morning.
☾ Last Quarter, 25th day, at 8 h. 59 m. morning.

☉ enters ♐ 22d day, at 4 h. 12 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	43	43	14 S.	24
7	11	43	50	16	16
13	11	44	26	17	57
19	11	45	32	19	27
25	11	47	8	20	45

M. D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	IV								
1	Tu	All Saints	55	33	5 m	24	3 a	26	0	17	0	44
2	W	All Souls. Mich. T. beg.	57	31	6	53	3	53	1	10	1	35
3	Th	Princess Sophia born	59	29	8	18	4	25	1	57	2	19
4	F	K. William III. landed	VII	27	9	36	5	9	2	42	3	5
5	S	Gunpowder Plot, 1605	2	26	10	42	6	4	3	28	3	51
6	Sun	24 Sun. aft. Trin. Leon.	4	24	11	34	7	10	4	14	4	37
7	M		6	22	0 a	12	8	21	5	0	5	23
8	Tu	♄ sets 7 33 aft.	7	21	0	39	9	33	5	46	6	9
9	W	Ld. Mayor's D., 391st an.	9	19	1	1	10	43	6	31	6	54
10	Th	Jupiter sets 8 2 aft.	11	17	1	18	11	52	7	17	7	40
11	F	Trans. St. Martin	13	15	1	34	morn.		8	4	8	29
12	S		14	14	1	48	1	1	8	55	9	22
13	Sun	25 Sun. aft. Trin. Brit.	16	12	2	2	2	8	9	48	10	13
14	M		18	11	2	17	3	15	10	40	11	6
15	Tu	Machutus	20	10	2	34	4	24	11	31	11	56
16	W	Mars rises 2 40 morn.	21	9	2	55	5	34	—	—	0	20
17	Th	Hugh Bp. Linc.	22	8	3	22	6	46	0	44	1	8
18	F	Venus sets 5 46 aft.	24	6	3	58	7	57	1	31	1	55
19	S		27	5	4	44	9	4	2	18	2	41
20	Sun	26 Sun. aft. Trinity	29	3	5	42	10	1	3	3	3	26
21	M	Princess Royal born.	31	2	6	52	10	47	3	48	4	10
22	Tu	Cecilia	32	1	8	10	11	23	4	32	4	54
23	W	St. Clement	34	0	9	31	11	50	5	16	5	38
24	Th	Mercury rises 5 48 morn.	35	III	10	53	0 a	13	6	0	6	22
25	F	Catherine. Mich. T. ends	37	57	morn.		0	31	6	46	7	12
26	S		38	56	0	15	0	48	7	40	8	13
27	Sun	Advent Sunday	40	55	1	38	1	7	8	48	9	26
28	M		41	54	3	1	1	27	10	6	10	44
29	Tu		43	53	4	26	1	51	11	19	11	51
30	W	St. Andrew	45	53	5	50	2	19	—	—	0	20

ASTRONOMICAL MEMORANDA.

5th day, Venus in conjunction with the Moon.
7th — Saturn and Jupiter in conjunction with the Moon.
12th — Mars close to η Virginis.
13th — Venus at greatest brilliancy.
28th — Mars in conjunction with the Moon.

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MOON'S QUARTERS.

- New Moon, 2d day, at 4 h. 15 m. morning.
- First Quarter, 9th day, at 10 h. 24 m. afternoon.
- Full Moon, 17th day, at 6 h. 46 m. afternoon.
- Last Quarter, 24th day, at 4 h. 45 m. afternoon.
- New Moon, 31st day, at 7 h. 2 m. afternoon.

☉ enters ♑ 22d day, at 4 h. 56 m. morning

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	49	12	21 S.	49
7	11	51	38	22	37
13	11	54	23	23	10
19	11	57	17	23	26
25	12	0	17	23	25

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	MOON Rises. m	MOON Sets. h	MOON Sets. m	High Water, London Bridge. Morn. h	Morn. m	Aftern. h	Aftern. m
			VII	III								
1	Th	Saturn sets 6 12 aft.	46	52	7 m	11	2 a	58	0	47	1	13
2	F	Jupiter sets 6 56 aft.	48	52	8	22	3	48	1	38	2	2
3	S		49	51	9	19	4	49	2	26	2	49
4	Sun	2 Sun. in Advent	50	51	10	6	6	0	3	12	3	34
5	M		51	51	10	38	7	13	3	54	4	14
6	Tu	Nicholas	52	50	11	3	8	25	4	33	4	52
7	W	Mars rises 2 30 morn.	53	50	11	23	9	37	5	11	5	31
8	Th	Conception B. V. M.	54	50	11	37	10	44	5	50	6	10
9	F	Venus sets 4 47 aft.	56	50	11	52	11	52	6	30	6	50
10	S		57	49	0 a	6	morn.		7	10	7	32
11	Sun	3 Sun. in Advent	58	49	0	22	0	59	7	57	8	24
12	M		59	49	0	38	2	8	8	51	9	19
13	Tu	Lucy	59	49	0	57	3	17	9	48	10	18
14	W	Ember Week	VIII	49	1	20	4	29	10	48	11	18
15	Th		1	49	1	53	5	40	11	48	—	—
16	F	Cam. T. ends. O! Sap.	2	50	2	35	6	49	0	17	0	44
17	S	Oxford Term ends	3	50	3	30	7	51	1	11	1	37
18	Sun	4 Sun. in Advent	4	50	4	39	8	44	2	4	2	29
19	M	Mercury rises 7 48 morn.	4	50	5	55	9	23	2	52	3	14
20	Tu		5	51	7	17	9	54	3	35	3	56
21	W	St. Thomas. Shortest Day	5	51	8	41	10	18	4	16	4	36
22	Th	Saturn sets 5 2 aft.	6	51	10	4	10	38	4	55	5	14
23	F	Jupiter sets 5 57 aft.	6	52	11	25	10	56	5	33	5	55
24	S		7	53	morn.		11	14	6	18	6	43
25	Sun	Christmas Day	7	54	0	47	11	33	7	10	7	41
26	M	St. Stephen	7	55	2	10	11	53	8	16	8	55
27	Tu	St. John Evan.	8	55	3	33	0 a	20	9	35	10	14
28	W	Innocents	8	56	4	54	0	54	10	52	11	26
29	Th		8	56	6	6	1	38	11	58	—	—
30	F		8	57	7	10	2	33	0	26	0	53
31	S	Silvester	8	58	8	0	3	40	1	20	1	46

ASTRONOMICAL MEMORANDA.

3d day, Venus in conjunction with the Moon.
4th — Saturn in conjunction with the Moon.
5th — Jupiter in conjunction with the Moon.
19th — Venus in inferior conjunction with the Sun.
22d — Winter commences.
26th — Mars in conjunction with the Moon.
28th — Mercury in superior conjunction with the Sun.
30th — Venus in conjunction with the Moon.

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IMPORTANCE OF EDUCATION TO WORKING MEN.

In the session of 1840-1, a select committee of the House of Commons was appointed to consider and report on the propriety of extending the control of the Board of Trade over the management of railways, in order to the better protection of the public against railway accidents. Among the points raised by this inquiry, was the probable influence of education in making engine drivers more skilful, steady, and attentive. The commonly received opinion had previously been, that the shrewder, cleverer, and better informed any man is, the more likely he is to perform well any task entrusted to him; but, to the surprise of the committee, — a surprise in which all the world has since largely shared, — Mr. Brunel, the eminent engineer of the Great Western Railway, asserted most stoutly the superior advantages of dulness and ignorance! Dissenting altogether from the views of this gentleman, we are anxious to exclude any suspicion of misrepresenting them, and shall therefore quote his own words at length.

"There is another regulation suggested, and which I presume is to be acted upon; it is, that an engine driver shall be able to read his instructions. Now, I dare say, that appears to a great many gentlemen a very essential thing; but not only do I maintain that it is not essential, but I maintain that the mere laying down that rule, as a rule, is a proof that the party suggesting it is not acquainted with the class of men that we are dealing with, and must deal with, as engine drivers. I should have thought, too, that Sir Frederick Smith's knowledge of the world and of military life, of privates, would have told him that the class of men who must be employed as workmen are not a class of men who learn their instructions from reading; even if they can read, their knowledge is obtained entirely orally. A man of that class has not obtained, as we have, the power of reading and remembering what he reads. Those sort of men will read and derive a little amusement from what they read, but they have not obtained the power of learning things by reading; they learn orally entirely. As to the instructions, it is true we print them, and it is true we make them read them, and we make them sign them, partly to ensure their having an opportunity to see them, but very much to satisfy the public mind when an accident has occurred; but I do not believe the men obtain the slightest knowledge of their instructions by reading: they may read them through, and get up with the printed letters in their eyes; but as to obtaining information from it, they do not; they obtain their information orally; *and whether a man can read his instructions or not, does not affect the question of his being a good engineer or not.* Our very best man on the Great Western Railway, the very best engine driver we ever had, a very superior man, who is now foreman of our engineers at Reading, a man whom I trust better than any body I have got on the line, can neither read nor write, and yet he issues instructions, and he has a clerk who writes written orders; and it would be a serious mischief if any regulation of the legislature should deprive us of him, and of a number of others that we have. I am not one to sneer at education, but I would not give sixpence in hiring an engine man because of his knowing how to read or write. I believe that of the two, the non-reading man is the best, and for this reason, — I defy Sir Frederick Smith, or any person who is in the habit of reading, to drive an engine. If you are going five or six miles without any thing to attract attention, depend upon it you will begin thinking of something else. It is impossible that a man that indulges in reading should make a good engine driver; it requires a species of machine, — an intelligent man, an honest man, a sober man, a steady man; but I would much rather not have a thinking man. I never dare drive an engine, although I always go upon the engine; because if I go upon a bit of the line without any thing to attract my attention, I begin thinking of something else.

"*Lord Sandon.* What is the duty of the engine man? — It is the simplest possible thing. He must first of all have a good constitution, and be able to stand rough weather; in fact, a gentleman cannot be an engine driver, or any man who can earn a livelihood in any quiet comfortable way; he must know something of machinery.

"To what extent?—To a very small extent; of course he must know the parts of a locomotive engine, and he must be something of a workman, although the fine workmen rarely make good engine drivers; he must be a sober man, and have all those qualities which are included in the general term of 'steady.' I hardly know how to define them; but he must be accustomed to follow orders, not desirous of infringing them, — not reckless, but be what is commonly understood by 'a steady man.'

"Ought he to be possessed of such a knowledge of the machinery as will enable him, if any thing goes wrong, to know where the mischief is seated? — That is such a very low class of knowledge of the machinery, that I can hardly call it knowledge; a mechanic learns that in a fortnight or three weeks."

The avowed wish of Mr. Brunel is to obtain an engine-driving machine; and for want of one which more exactly fits his purposes, he cuts a man down till he makes one out of him. Let us see, however, whether the machine he thus obtains,

answers to his own description of the necessary qualities. An engine driver, it seems, should not read, lest on a plain piece of road he should think of something else besides driving. But how does ignorance of the art of reading prevent his having other subjects of thought? To all the varied anxieties and pleasures, the disagreements and charities of life, he is as accessible without the power or the habit of reading as with it; and in a moment of relaxed attention, his thoughts, though not occupied with the speculations of science, or the softening elegancies of literature, may be just as likely to revert to his sick child or his scolding wife at home, to his pot companions, or his bets on the next prize fight; or, if he be that rare thing among those who cannot read, "a steady man," he may perhaps be devising how, now another child is come, he is to add to his scanty sleeping-room without adding to his rent; or he may think a little about last Sunday's sermon, if, perchance, railroad duty let him hear one; or about the business done at last night's meeting of the committee of his benefit society; or, perhaps, as is still more likely, he may revolve some fondly cherished though preposterous mechanical scheme, by which he has long dreamily hoped that he shall one day make a fortune. No! ignorance of reading is no preventive of wandering thoughts; one would wonder, indeed, how any man could force his way to the conclusion that it could be.

It was, we presume, when warmed with his subject, that Mr. Brunel avowed, as above, his preference, his decided preference, for the unreading and unthinking engine driver. He had previously contented himself with asserting that, as an engine driver, a man was no better for an ability to read. Men of that class, he asserts, learn nothing by reading. If so, of what use is the clerk who writes the orders given by an illiterate superintendent? To whom are the orders given? We presume not to the reading and writing superiors of the superintendent; and if not, they must be to the class of men who learn nothing by reading! An inconsistency like this is enough to show the barren crudeness of the notions on which this dashing opinion is founded.

But this is not enough. It is safe to affirm, and not difficult to show, that by a habit of reading, and the tendency to thinking which that habit encourages, a man will be improved as an engine driver. The argument would well afford that we should give up all that refers to the current and immediate exercise of his craft, — that we should concede his ordinary mechanical duties to be so slight and so simple that he can learn them all, well and easily, without reading a line about them. We do not admit this, however, except for the sake of simplifying the argument. Whoever will take the trouble to read an excellent little book, entitled "Practical Hints for the Management of a Locomotive Engine," written by Mr. Charles Hutton Gregory, the engineer of the Croydon Railway (son of that distinguished friend of mechanics, the late learned and philanthropic Dr. Olinthus Gregory), will be at once convinced that a very small amount of judicious reading may abridge by one half the time necessary to mature the experience of an engine driver. But what are accidents on railways? Dreadful results of rare contingencies. Iron steeds and mountainous loads now daily whisk over thousands of miles; but to how many of these do serious accidents happen? To few, wonderfully few. What are the consequences when they do happen? They have been, they may again be, most appalling. And it is doubtful whether, though fewer may hereafter happen, those which do happen will not be of a more dreadful kind. But how are the very unusual circumstances which bring about these catastrophes to be avoided? Not to say that the engine driver is himself most commonly a victim, the very infrequency of the consequence, prevents the acquisition by any individual driver of experience as to the particular circumstances by which it is brought about. How, then, is he to be made aware of the importance of the particular precautions or neglects which facts have shown to result in safety or disaster? How is misfortune to one man, and on one line, to be made to contribute by its sad and impressive proof to the skill of all other drivers, and the safety of all future travelling? Try whether mere verbal spreading of the tale will do it. By the time it has passed through half a dozen hands all its truthful and impressive features are lost, and there remains of it only what may inspire fear without affording caution. The directors of the Manchester and Leeds Railway act very judiciously on this view of the matter; they print expressly for the use of their servants accounts of all railway accidents as they happen. Nothing can be better calculated to promote the safety and reputation of their line. The accuracy with which, by paper and print, an account is preserved, and the rapidity with which thousands receive it, are now, like light and air, among those daily blessings of the value of which we are unconscious, simply because they are daily and unvaried.

Whoever has conversed much with unreading but clever workmen, must have been struck with the ridiculous, and often absurd notions, which they generally have on mechanical subjects. If some of their individual opinions chance to be right, those opinions are in no degree connected and confirmed by general principles; but it is more commonly found that their thoughts are a loose compound of nostrums, observed facts, and mere fancies, mixed up with unsound conclusions from them all. And these are confirmed to them in many cases by commendations on ignorance pronounced by their tippling fellows, and perhaps even by men like Mr. Brunel.

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Sometimes, too, their observation of facts which have escaped the attention of better thinkers, but which their daily contact with tool and material has brought under their eyes, exalts them at once in their own estimation to the rank of practical men, and they think themselves entitled accordingly to look down on all thinkers as mere useless droning theorists. Place now such a man in the unusual, unexperimented circumstances, from which accidents on railways commonly spring, and what hope is there that his mental habits should suddenly lead him to devise the means of safety or of extrication? And what chance is there that he should duly appreciate the cautions he may receive, or estimate as he ought the dangers his precipitancy or his meddling may incur? How many and how fearful were at one time the dangers incurred by the rash management of ignorant engineers of steam boats!

But, says Mr. Brunel, working men learn nothing by what they read. Abolish then their own cheap scientific literature,—of what use is it? Be it remembered, Mr. Brunel's argument goes as strongly against the reading of any other working man as against that of an engine driver, and his assertion of the nugatory effect of reading applies to all others as strongly as to them. But have our cheap magazines, our popular treatises, our systems translated from the language of deep science into that of ready apprehension and daily use,—have they done nothing towards raising the character and efficiency of our artisans? Are the present occupants of our workshops as uninstructed and as unruly as the handicraftsmen of thirty years ago? And if not, as we joyfully believe, the change can be traced to no other cause than the influence of individual copies of books on individual reading men. The single artisan has been instructed by reading, and these single instances amount by multiplication to the total magnitude of the change. In the general aspect of our workmen we find the sure test of the effect of reading: scores of instances familiar to every person conversant with workshops show the personal process by which that general effect is brought about.

How was it that the art of printing lay so long comparatively dormant as to its effect on the mass of society? How was it that the truths of mechanical science known, some for ages, and the most modern for more than two generations previously, became operative for general good only in the middle of last century, and then only through the agency of a few single minds; while at the present day invention following invention, and improvements treading on the heels of each other, are every day changing the character, and enlarging the objects, the effects, and the hopes of our mechanical arts? Clearly, because the printed wisdom was inaccessible to the mass of men through their ignorance of the art of reading. The Raikes's, the Lancasters, the Bells, &c. are the true fathers of the character of the present age.

Surely Mr. Brunel cannot be aware of the extent of his own assertions. He is deceived, we think, by the aspect of individual instances, through not having taken into his account the fact that in these instances the intellectual condition has been greatly modified by association with reading men. Take half a dozen unreading workmen, and mix them for years with as many of the opposite character; compare them then with six such men who have associated with others as uninstructed as themselves. Who cannot see the difference which the intercourse must have wrought? To say nothing of the newspaper or magazine daily read to the listening circle at meal times or in the evenings, in which circle those who cannot read often make the most eager listeners, the very conversation of their fellows who have read is tinged with opinions, and formed by principles, which only books could have brought to bear upon them. A higher strain of thought, and a juster course of reasoning, gradually, and after many abortive efforts, make their way among them, and thus even the second-hand effect of reading raises a palpable difference among those who cannot read. If Mr. Brunel's argument be good at all, it is good to the extent of asserting that a working population of whom none read is more effective, and more to be trusted, than one of which many of its members indulge in the human propensity to thinking;—an assertion which only hasty inductions from solitary facts could have induced any thinking man to venture. He may have seen a single instance of a good illiterate engine driver, who had learnt something by intercourse with his reading fellows; but he gains no credit for careful thought by founding on such an instance a broad assertion, that an unthinking man makes the best driver.

The duties of an engine driver are apparently of a very simple character; but, like all other duties, they require for their safe and punctual performance a certain moral temperament. Punctuality is the main element of railroad safety; but the tendency to irregularity, and in the end to negligence, to which the long intervals between serious accidents give rise, can only be counteracted by a habit of attention founded on and kept up by a sense of duty. Now, we do not say that the very simple and obvious relations on which the moral duty of an engine driver is founded, or the appalling character of the possible and usual consequences of neglect, may not easily be comprehended by the dullest driver who ever evaded a knowledge of the four and twenty letters; but we do assert that with equal clearness of conception as to duty, the impressibility of

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individuals by that conception differs very largely; and, other things being equal, it differs very nearly with the extent and vigour of the intellectual operations. The frequency with which these considerations recur to the mind, — on which frequency their ultimate effect on the conduct mainly depends, — is greatly influenced by the number and variety of the circumstances which may originate the trains of thought which lead to them. Whoever has watched his own thoughts is aware that the most unlikely commencement will often, through repeated turns of association, conduct to old and most important conclusions; and he will not dissent from our assertion that a mind well stored with facts, and well habituated to thought, is the most likely to feel with frequency and force the serious obligations under which it lies, and to give itself up to their control. Give us, therefore, we say, reading drivers.

It requires no profound view of society to find instances of the practical effect of these principles. To leave out of question the established fact that the greater number of convicted criminals are grossly ignorant, let us look at the classes whose occupation, not yet superseded by mechanical innovation, is severely laborious and exclusively corporeal; we find them proverbially blackguards. Every degree above this, in which skill is mixed with labour, seems to bring with it a humanizing tendency. Nobody is surprised at the riots of excavators or hodmen; but working engineers who read are generally men of decency and order at least, and often of superior character. Between these extremes will be found every shade of propriety of conduct, existing generally in conformity with the proportions in which intellectual effort, either voluntary or required by the occupation, is associated with manual labour; and we think the fact is fully accounted for on the principles already pointed out.

But if so much depend on the amount of intellectual occupation, of what importance is it that employments in themselves deficient of it should have it artificially supplied? And how can we deem any means superfluous by which it can be so supplied? If the brutifying severity of bodily labour could be so reformed as to allow occasional mental occupation to excavators and hodmen, nobody would fear that the next generation of these necessary labourers would disgrace themselves by the turbulence and sensuality of their predecessors. This remark, however, applies with tenfold force to the case of an engine driver. According to Mr. Brunel, considerable intervals occur in which his employment does not employ his thoughts, while the equal absence of corporeal strain leaves full chance for their exercise; now think at these times he will and must. On the occupation of this reverie depends the moral character of the man, and his growing fitness or unfitness for his post. If, as is most likely with an unreading man, his musings are conversant with gross and debasing subjects, he will acquire a fouler taint of selfishness and a lower sense of moral obligation: if, on the other hand, he have been encouraged to supply his thoughts with sound and useful food, his unavoidable excursions of attention will strengthen his principles, enlarge his views, and confirm the general excellence of his character. The one, if he live so long, will probably become a headstrong sot, and the other a valued and trustworthy servant.

We are quite aware that there are apparent exceptions to the general rule of superior intelligence giving greater useful force to the character; or rather that cases are occasionally seen, in which great efficiency is found in persons who cannot read, and whose information on any subject but those immediately connected with their occupation is extremely limited. We say these exceptions are apparent only; for, as in other cases of seemingly conflicting evidence, they confirm, on examination, the very truths which at first they seem to threaten. In all cases of great efficiency with small knowledge, it will be found that the intellect is fully and laboriously occupied with the business which it undertakes. The arrangement of affairs, the recovery of facts, the comparison of results, the calculation of probabilities—which are all done with great ease by an educated person, and the doing of which leaves him leisure for improvement or enjoyment — is done by the unreading man by continual mental recapitulation of all his affairs: his evanescent record demands continual retouching; and his perplexing though simple combinations can only be managed by repeated and varied disentanglement and recomposition. We have known cases where the mental effort thus employed in a small business has been incomparably greater than that exercised by the skilful head of a large concern, and probably exceeded that by which the finest systems of science have been evolved. By this continual employment of the thoughts the character, it is true, acquires great force; but it is a force applicable in scarcely more than one direction, and (what is more to our purpose, and Mr. Brunel has failed to remark) the strength depends on that very constancy of occupation of the thoughts, which, by his own statement, the business of the engine driver does not afford.

Mr. Brunel, however, wants engine drivers; and it matters nothing to him whether the men who suit him are regular instances or exceptions. He wants an attentive driver; and that he may be so, he says he would rather he did not read: but we think we have shown that perfect innocence of alphabetic lore does not necessarily insure attention. Again, he wants a steady man; but, for reasons we have given, we believe the chances are that

an ignorant man will not be such. He wants, moreover, an intelligent man; but it passes our power to guess how he will procure "an intelligent man" who is not "a thinking man." It is, however, no new thing to find that the off-hand possessors of "a little brief authority" are occasionally fretful for instruments with at once more pliancy and more power than nature usually compounds together.

Let us, however, change the scene a little, that we may abstract more carefully from the mere incidentals of the case. Suppose a ruler to want railroads, as railroad engineers want drivers; and let him say, "I don't want thinking engineers; all they want to know is very little and very simple, and to know more will only distract their attention. As to history or politics, poetry or general science, I would have them let them alone. I only want them for making railroads." What in this parallel case would be said of the motives or the wisdom of the ruler? And what would be the effect on engineers and railroads?

Mr. Brunel, however, wants "a species of machine;" and if he will devise a veritable cast-iron engine driver, he shall have our most cordial thanks. But we enter our determined and solemn protest against his mode of cutting off the attributes and aspirations of humanity, that he may make of it an engine-driving machine. It would be a less monstrous violation to cut off a man at the knees, that he might walk upright between the low decks of a slaver. Thanks to the Providence who constituted the material world with such marvellous fitness to the human nature which for the present inhabits it, we believe that every succeeding mechanical improvement will only the more fully bring out its power of assisting in the improvement of the intellectual and moral character of men. In this confidence we can afford to think lightly of the opposing premium on ignorance which Mr. Brunel's opinion may supply. We cannot, however, entirely pass by this inconsiderate attempt to show that in the very service of the most important improvement which Providence has latterly brought before the eyes, and into the use of men, there is a station where it is necessary to hold down the upward and strengthening tendencies of thought, to chain man down to visible grossness, and to make him feel that he is to live merely as a "machine." The attempt is as vain as it is foolish; its future failure will be as visible as is its present want of true philosophy. To try to make machines of men may betray a foolish ambition, and a morbid thirst of power; and so might a like attempt to tie a railroad carriage to a comet's tail.

Mr. Brunel, by his own choice, stands prominently before the public as an engineer; and he ventures boldly his remarks on mental constitutions and processes: on either ground he is a fair mark for candid criticism. His strain of argument on the subject before us coincides remarkably with nearly all else that he has done to show that his is not the mind which founds large designs on calm, extensive, and philosophic application of ascertained principles; his mode of proceeding is rather the venturous and resolute prosecution of many and bold expedients. Accordingly he splendidly succeeds, or unblushingly fails. To those who love the dashing chance, we cannot recommend a leader more likely to win brilliant prizes for them; but they must be content if he draws for them a blank. His undoubted talent and untiring perseverance will always place him high amongst his compeers; we only regret that they are not associated with sounder philosophy and more careful thought. Perhaps, however, we are wishing for too much. No man can be every thing; and it may be that Providence, who uses each for the good of all, uses Mr. Brunel for the accomplishment of purposes which wiser men would not dare to attempt.

THE CORN LAWS.

THE regulation of the supply of corn, and the protection of the supposed interests of the landowners, have engaged the attention of our legislature from the earliest period. From the Conquest to the reign of Henry IV., exportation of corn was totally prohibited; then it was allowed when the home price exceeded 6*s.* 8*d.*, equal in pure silver to 12*s.* 10¾*d.* at the present day. In 1533 exportation was again prohibited without the king's licence. In 1562 exportation was permitted at 10*s.* for wheat, and 6*s.* 8*d.* for barley. In 1571 a duty was substituted of 2*s.* per quarter on wheat exported, when the home price did not exceed 20*s.* per quarter, and 1*s.* 4*d.* on barley and malt when at 12*s.* The lords president and councils of the North and of Wales respectively were to hold annual conferences with the people, and to determine by the result whether it were proper to allow the export of corn from their several districts. At the Restoration, the price at which exportation might take place was raised to an amount equivalent to absolute prohibition. In 1663 the agriculturists procured a repeal of this duty and the substitution of one *ad valorem*. In 1670 the exporting price was fixed at 53*s.* 4*d.* At the accession of William III. a *bounty* of 5*s.* was given on importation while wheat was at or below 48*s.* per quarter, and so in proportion with other sorts of corn. Down to 1766 England was a large exporter of corn. From 1697 to 1773 the bounties paid on exportation amounted to

no less than 6,237,176*l.* After 1766, the increase of population consequent on that of manufactures occasioned the balance to turn the other way; and then the question with our landed interest came to be, how they might best secure to themselves the exclusive supply of the home market.

For 400 years after the Conquest, the importation of wheat was substantially free; but in 1463 it was forbidden when the home price did not exceed 6*s.*8*d.* per quarter, the standard price fixed by the act of 1436 for exportation. The importation price was raised in 1603-4 to 26*s.* 8*d.*, and in 1623 to 32*s.* In 1670, when, as before stated, the exporting price was greatly raised, a duty was laid on importation, which effected the exclusion of foreign corn; it was 16*s.* when the home price was 53*s.* 4*d.*, and 8*s.* when above that price and under 80*s.*; at 80*s.* importation was free. The act for this purpose seems to have been occasioned by a great depression of prices through abundant harvests, but to have failed of its purpose. Plentiful seasons in the latter end of the 17th and beginning of the 18th century put importation out of the question; and from 1720 to 1750, the price of wheat had so fallen, while wages had risen, that a labourer *could purchase a peck of wheat with a day's labour.* Trade flourished greatly. Deficient harvests, however followed, and rising manufactures brought on an increase of population. In 1766 the quartern loaf sold in London for 1*s.* 6*d.*, and addresses were sent from various parts of the country complaining of general distress. Exportation was suspended in 1770 and 1771, and importation allowed duty free to the 1st of May 1773. The city of London actually offered a bounty of 4*s.* per quarter for 20,000 quarters of wheat, to be imported in that spring. In 1774 the duty on importation was fixed at 6*d.* per quarter when wheat was at or above 48*s.* at the port of importation. Matters continued on this footing down to 1792; and it is remarkable that during the whole of this period prices were steadier than they had ever previously been. Every branch of rural economy was more improved than in the whole of the preceding century. In 1788, when the country had recovered from the effects of the American war, and the newly risen manufactures of cotton, pottery, &c. had attained some extent and stability, the imports began to permanently overbalance the exports, and the landed interest urged that England had become dependent for food on foreign countries,—a plea which would have appeared with much more of the grace of disinterestedness in the mouths of other parties. In 1791, their influence in the legislature procured them an act by which the *bounty* system was again brought into operation; 5*s.* per quarter being given them when wheat was under 44*s.*, and exportation ceasing when it was above 48*s.* The import duties were 24*s.* 3*d.* when wheat was under 50*s.* per quarter, 2*s.* 6*d.* from 50*s.* to 54*s.*, and 6*d.* when wheat was at or above 54*s.* The obvious intention of this act was to exclude importation altogether; but deficient seasons defeated the purpose of its authors. Extremely high prices and great distress were the consequences, and measures were taken for relief, whose very violence shows the extent of the mischief. Bounties were given on importation, certain old and absurd laws against forestalling were revived, and even neutral vessels were seized on the high seas, and the owners compelled to sell their cargoes to government agents. The very act, the professed purpose of which was to render England independent of foreigners for supplies of food, by destroying the import corn trade, rendered the dependence, when it did occur, tenfold more fearful. It was, however, the tolerably abundant harvest of 1801, and not the devices of law makers, which relieved the distress. Wheat, which in March 1801 had averaged 155*s.* 2*d.* the quarter, fell in June to 129*s.* 8*d.*, and by the end of the year to 75*s.* 6*d.* The two following years were favourable, and the price sunk in 1804 to 49*s.* 6*d.* The agricultural counties then met to ask for protection, although they had profited by the preceding scarcity to the amount of nearly twenty millions sterling. In that year a new act was obtained, raising the prices at which the three different duties of the previous act were payable to 63*s.*, 66*s.*, and above 66*s.* Prices then rose, partly through the act, no doubt, but more through bad seasons and the difficulties thrown by war in the way of obtaining supplies from abroad; large importations were made at enormous risk and expense to supply deficient harvests, and 80*s.* per quarter became the average price. The production of corn thus received an unnatural impulse, which rebounded fearfully when the peace brought about renewed intercourse with the Continent, and the inevitable return to a metallic standard of prices put an end to fictitious money rates. To maintain these high prices, rendered necessary to them by the habits and engagements contracted during this artificial period, the landowners in 1814 brought in a bill to prohibit importation when the price was below 80*s.*; but the resolute resistance of the country compelled them to abandon it. The bounty on exportation was abolished, and exportation was permitted at all prices. In the following year, however, the bill was carried in the midst of riots and disturbances, in spite of the most strenuous parliamentary opposition, and of an able and often quoted protest drawn by Lord Grenville, which was signed by eleven peers, with the Dukes of Sussex and Gloucester at their head. The farmers had not yet learned that laws cannot make permanent prices, and many took farms at extravagantly high rents, under the conviction that they should get at least 80*s.* per quarter for their corn. But prices continued to fall in spite of the law; and in March, 1822, wheat was 47*s.* 9*d.* per

quarter. To help the agriculturists in this emergency, a million of money was in 1822 set apart by government, with which to buy up corn when the price was under 60*s.*; that is to say, a million of money was taken out of the pockets of the people, in order to raise the price of food to the people beyond its natural level! It was further ordered by act of parliament, that foreign wheat should not be admitted till the home price was 70*s.* per quarter, and then at 12*s.* duty. Above 70*s.* and under 80*s.*, 5*s.* was to be paid, with 5*s.* additional for the first three months; above 80*s.* and below 85*s.*, the duty was to be 1*s.* only. This new act, however, never really came into operation, and the deficient harvest of 1826 compelled government to ask for powers to admit 500,000 quarters. Mr. Canning attempted to amend this system, but was defeated by the Duke of Wellington; and for the three successive years, 1825-6-7, it was necessary in a greater or less degree to relax the law. In 1828 the present system became law, by which 1*s.* per quarter import duty is laid on wheat when the price is 73*s.*, and the scale slides until 64*s.* is imposed when the home price is 53*s.* Neither steadiness nor plenty has been secured by this plan; the price in December 1835 was 55*s.* 4*d.*, and in January 1839 it was 81*s.* In May 1841, Lord John Russell proposed a fixed duty of 8*s.* per quarter; and the pressing circumstances of the case have made this proposal the great question of the present day.

The *internal* traffic in corn has been subjected at times to restrictions equally unwise with those by which lawmakers have attempted to regulate the transmarine commerce in this indispensable commodity. Corn dealers have in our own day been held up to execration as most odious monopolists; it is not to be wondered at, therefore, that dearths and high prices were in the days of the Plantagenets attributed to their practices. Forestalling, regrating, and engrossing were considered grave offences. The use of capital in laying up the cheap articles of a time of plenty for future consumption was not understood, and accordingly extreme fluctuations of price were of common occurrence. In 1317 the price of wheat just before harvest was 4*l.* per quarter; immediately after it fell to 6*s.* 8*d.*! An "Act for the maintenance and increase of tillage and corn," passed in the reign of Henry VIII., *commanded* that in each parish at least as much land should be tilled as had been under the plough since the accession of the king. In September, 1549, a proclamation forbade any man to buy and sell the selfsame articles of food again except brokers, and these brokers were not to have more than ten quarters of corn in possession at once. Justices were to search the barns, and to direct the surplus corn they found to be sold; and one justice was to be in every market to see the corn sold. Every person neglecting to take his corn to market as he was appointed was fined 10*l.*, except the king's purveyors took it up, or it was sold to his neighbours. The authority of a statute was given to these regulations in 1551. Engrossers were made liable to heavy penalties, and for the third offence were to be set in the pillory, to forfeit their personal effects, and be imprisoned during the king's pleasure. Farmers were to sell an equal quantity of corn instead of that they bought for seed. Persons, however, might buy up wheat *when it was under 6s. 8d. per quarter.* In 1552, only certain persons, called corn-badgers, were allowed to be dealers in corn for the use of towns and cities, and they were to be licensed by the justices; but, in ten years after, restrictive rules for the licensing of these persons were enacted, and they were required to find security that they would not buy out of open market. All these stringent laws were demanded by the people, who erroneously imagined that the high prices which then often made it a matter of extreme difficulty to obtain bread were attributable to the arts of the dealers. In 1663, however, engrossing of corn was made legal when the price did not exceed 48*s.* per quarter; and in 1773 better views had so prevailed that the last remnant of these mischievous laws was swept away. During the dearth, however, which distinguished the close of the last and the beginning of the present century, and while men were almost frantic under the pressure of it, corn dealers were accused of barbarously aggravating the distress, — an offence now allowed by all sound economists to be of just as impossible a nature as witchcraft. A person of this class was convicted, under the common law, of the offence of engrossing, though never called up for judgment; and Lord Kenyon, at the Salop assizes, actually threatened the vengeance of the law on all who were guilty of this unpopular practice. Since that period juster notions have been rapidly gaining ground, and the old prejudice against perfect freedom of the internal trade in corn has lurked only in remote and obscure corners of society.

Experience shows that plentiful years are seasons of general comfort and widespreading improvement; a succession of them, however, has always brought on very low prices of corn, and great alleged agricultural distress. Years of deficient crops and high prices invariably produce general misery. It seems, too, that laws and restrictions are not strong enough to control prices, although they are abundantly powerful in mischievously disturbing with that purpose all the sound and natural relations of the elements of society.

Even while the average production of England was undoubtedly more than enough to supply its population, the laws regulating the trade in corn never worked satisfactorily, as appears from the frequent changes in them. Dearths and gluts, high prices and low, starvation and wild plenty, seem to have frolicked through the land as

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they would, in spite of all that law could do against it.

But it commonly happened that the law itself defeated its own purpose. If it forbade exportation, it discouraged production; if it prohibited importation, it gave an artificial stimulus to tillage, and the next series of productive years brought ruin on the farmers.

But when a new state of society arose different from all that had gone before it, when manufactures had thickened our population, and compelled us constantly to import food, all that before was mere mistake became madness; and had it not been that the stirring spirit of improvement, awakened by the success of the new manufactures, extended itself to agriculture, and so enabled the land to feed many more than it had done, persistence in an exclusive policy would have been not merely madness, but fatal madness.

If England deliberately choose to part with her manufactures, so let it be; but let it be known that such is her choice. She cannot keep her manufactures and her corn laws at once.

The earliest efforts of a civilized people are necessarily directed to the improvement of its agriculture, and of the simple arts immediately connected with its infant state; and it is clear that future efforts will continue to take the same direction until the taste for conveniences and elegancies has been fostered by the accumulation of capital, and by its consequence, plenty. If, now, these conveniences and elegancies can be procured in exchange for superfluous produce, it is obvious that the easy and natural course will still be followed,—that of further improving, if practicable, that soil on which the accumulated wealth and the thickening population of the country are already engaged. But if such exchange cannot be effected, affairs will take of necessity another turn: stand still they cannot; for in every settled country not devastated by war there is a constant increase of capital and population, and employment for them must and will be found. To farther improvement in agriculture there is no motive; for the produce already more than feeds the people, and desired comforts cannot be bought with corn. To *manufacture*, then, is the only mode of action left, and this will be adopted; slowly and clumsily, indeed, if the arts have to be originated and perfected, but rapidly, and with terrible effect to others, if those arts can be borrowed from those who might have knit close by reciprocal benefits the brotherly band of nations, and would not.

If the population of England be restricted for food to the produce of England, it is clear that a time will come, or has come, when the charge of living here, with all our advantages, will be greater than that of living in less populous or less restricted countries; and that therefore a portion of the population will emigrate to those more favourable countries. Now that portion is less likely to consist of persons employed on the soil than those engaged in pursuits which may be carried on with equal facility elsewhere, and who can carry their peculiar skill to the places where it will be welcomed and rewarded. The growing wish for goods and want of occupation abroad, thus meets with the skill necessary for its purpose, expatriated by the operation of our laws at home. The directors and foremen of the cotton and other manufactories of France, Belgium, Holland, and Germany are chiefly English and Scotch artisans. British capital is fast following the operatives, but the land and land-owners cannot remove.

We are surrounded with countries which used to be, and wished to remain, large consumers of our manufactures; but under our refusal of their products they have reared within themselves, however unwisely, interests which are already claiming protection. Their governments continue to offer, but every succeeding year with diminished earnestness, commercial treaties which would yet, in some degree, restore the natural course of commerce, and preserve to us our due position. A short time longer, and our proffered liberality will find the door closed.

But it is objected, "we must not ruin our farmers." Of this there is no danger. Wheat at Dantzic, under an open market in England, is usually at 40*s.* per quarter: freight and expenses raise it to 49*s.*, which is above the average price in England in the low-priced year 1836, and only 17*s.* 4*d.* below the average of 1840. The better direction they could give their capital, and the more numerous openings which an extended commerce would provide for their children, would much more than compensate the farmers for any possible change they might experience from a better corn law.

The interest of the landlords is really with a fixed duty. Rent depends on population, and population depends on manufactures. Reduce the people of England to those the soil would employ, and what would become of rent? The first steps of this process are already taken, and will be retraced with difficulty.

Let us now suppose that all trade were perfectly free. *In that case* England's thick-set population would render it impossible that a redundant harvest should injure the farmer; and the British agriculturist would be always sure of a market far beyond his power of production, situated at his very doors, and upheld to him by the natural and inevitable cost of transport from any other soil.

But, if we may judge from what passes even under present unfavourable circumstances, moral and political consequences of even still greater moment would follow. England would become the storehouse of the world. It is true that other countries would have their manufactures; their

industry would not sleep, but they would follow us as friends, and each would take up the peculiar calling by which it was best fitted to supply a share of the wants of the human family. The advances England has already made would keep her at the head of her friends: the inventive talent of all nations would necessarily resort hither for the execution of its designs; our machines would thus receive the united improvements of the world, and remain the advanced standards of manufacturing perfection; while our maritime habits, the growth of generations, will ever make us the neighbours of the ends of the earth. It would not be too much for a British statesman to hope for, that his country, by the firm, though perhaps tacit consent of all nations, should become the depository of their produce and their treasures, and the centre of their operations, and its people and government the arbiters, if needed, of their disputes. Its insular safety and acknowledged force fit it pre-eminently for the more gross and material part of the office of steward of the nations: is it boasting too much to say that its intellect, and still more its moral feeling, are drawing towards it the confidence of the world? The ambition of other times and nations has been to rule: to England is open the infinitely higher destiny, if she will accept it, of leading, advising, befriending, and uniting all.

And what hinders? Blind, selfish, mistaken exclusiveness. Laws meant to insulate her prosperity cripple and endanger it; ordinances meant to set her above the nations excite their envy and their reprisals: instead of friendship we reap jealousy; instead of confidence we meet with rivalry; instead of mutual helpers we make growing enemies; instead of hope, peace, and honour, we fill ourselves with apprehension and trembling; and all because we will be rich, and none shall share with us. If our place as a nation pass away, it will be said of us, "They were destined to honour and strength, but in their blindness they destroyed themselves."

EFFECT OF THE PRICE OF FOOD ON THE RATE OF WAGES.

Among the questions of political economy which most frequently perplex the debates and obstruct the inquiries of the present day, is that of the influence of the price of food on the rate of wages. In the debates on the corn laws, it has been hastily assumed on both sides that cheap food will occasion low wages. The adverse parties then diverge in their arguments. One side says if wages are to fall as well as food, where is the gain to the working man? The other says, low wages will give us great export trade and plenty of employment. Although these arguments are put in opposition by the advocates of the two sides of the question, it is obvious that they may be both true or both false together. It may be true (we do not say it is) that wages will fall with the price of food, and that therefore the working man already in employment will be no better off than before; but it may also be that more employment at those lower prices can be obtained, and that therefore numbers unoccupied and unfed at the higher rate will be employed to comfort at the lower. It should be remarked that this change would be beneficial, not only to the additional persons employed, but to the capitalist who employs them, and still farther to all other operatives of the same class, inasmuch as *fullness of employment is the only effectual check to further reduction of wages.*

This is, however, not a complete or satisfactory view of the subject: it rests merely on the assumption that wages and food may possibly rise and fall together; the question is, *will they do so?*

The first feeling, on sitting down to answer this question, is that of surprise that it should ever have been thought that these prices would vary together, so full is society of examples to the contrary. If it were so, a uniform rate of wages must obtain through all trades, for the cost of food is the same to workmen in all. Years of dear food ought to occasion no distress, if wages and the price of food vary together. Nay, the principle, if true, goes much further: a man with a large family would, according to it, always have higher wages than another with a small one; for, be it observed, the doctrine is founded on the assumption that wages will be in proportion to the necessities of the labourers; and as the necessities of a large family are greater than those of a small one, so, according to it, should the wages be augmented of the person whose labour supports it.

Glaring as is this mistake, however, it has obtained very general acceptance. It seems to have originated from observing that in many countries where food is cheap wages are low. It is no unusual oversight to take fellow-consequences of a higher cause for consequences of each other; and so in the present case it has been hastily concluded that cheap food is the cause of low wages, without inquiring whether the cheap food and the low wages may not both be the consequences of a cause which is as yet out of sight.

Prices are the result of the ratio between supply and demand, expressed in terms of the currency of the country. If food be plentiful and eaters scarce, food will be cheap, absolutely cheap; but the money price at which it will stand, will depend on the relation between capital and the employment for it.

Let us suppose food plentiful and eaters

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scarce in one country, where there is abundant capital and little use for it; and let us further suppose food to be just as plentiful and eaters just as scarce in another country, where there is but little capital and plenty of use for it. It is obvious, that although food is *absolutely* just as cheap in one country as the other, yet the money expression of its value will be very different; in the country of over abundant capital it will take more money to buy a certain quantity of food than in that country which possesses but scanty capital.

Let us now suppose eaters to be abundant and food scarce; food will be *absolutely* dear. The money expression of value will be different in different countries, according to their capital, just as in the former case.

Even so also is it with labour; and therefore is it that in poor countries labour and food are both cheap in money value, though they may be in respect of each other just as dear as in a richer country.

But now, instead of expressing the value of food in *money*, let us express it by labour of any one given kind. If food be more plentiful in one year than another, and the quantity of the kind of labour referred to remain the same, it is clear that food will be cheaper than before, relatively to that kind of labour; if in another year the quantity of food be less than it was before, and the quantity of labour the same, food will be dearer relatively to the labour.

To take all circumstances into account, let us suppose a man to be employed, say, for instance, in making ribbons; he sells his labour in making them for money, and with that money buys food.

We have now six quantities concerned, ranging themselves in three pairs.

1. *a.* The demand for labour skilled to make ribands.
   b. The amount of labour of that kind ready to answer the demand.
2. *a.* The demand for food.
   b. The amount of food ready to answer that demand.
3. *a.* The demand for capital.
   b. The amount of capital ready to answer that demand.

If all these remain without change, or, what comes to the same thing, the members of each pair retain the original ratio to each other, wages will remain without change, whether they be reckoned in money or in food.

If the demand for labour rises, and the amount of labour does not, other things remaining the same, wages will rise both in money and in food; and if it fall, wages will fall. But the contrary will be the case with the labour which meets the demand.

So, also, if the demand for food change without a corresponding change in the supply; the value of food, whether in labour or in money, will change also.

And so on, further, if the demand for capital change without a corresponding change in the supply, the value both of wages and of food will alter as expressed in money, although they may remain the same with respect to each other.

The principles we have just laid down do, in the main and in the end, govern prices; but their operation is retarded by what we may call *the friction of society*. Time is required for parties to become acquainted with the changes that have taken place; these changes are often not known at all, and are only felt by the majority of persons in their effects, and in the mean time every body is acting on erroneous impressions which tend to aggravate the evil the change would of itself produce. For instance, a riband weaver finds he is well employed, and at good prices; he orders a new loom or two, and takes an additional apprentice; in the mean time a change of fashion takes place, which diminishes the demand for his goods below the productive power even of his former workmen and old looms; with his new loom and new apprentice he becomes distressed, and is compelled to offer his labour at almost any price to meet the difficulty. Had he known of the change a little sooner, the market for the labour of riband weavers would not have been encumbered with the additional apprentice and the new looms. And so of almost every other department of industry.

Again, a workman, if convinced that his trade is permanently depressed, cannot all at once change his occupation, and it rarely happens that he can change it soon enough to relieve himself from the effects of even a temporary depression.

As another example, we may instance the building of a mill by a person who borrows part of the capital, or who relies on the profit of his mill for his income. A change in the demand cannot be met by him at once, even if he is aware of it: his loss would be greater in doing so than in continuing to work for some time, and it is only by degrees he can accommodate his supply to the diminished market; in the mean time his old supply, now too great, pulls down the price unduly. It rarely happens, too, that a manufacturer reconciles his feelings to a diminished production as promptly as circumstances convince him of its necessity.

So a merchant, who has ordered home a cargo of goods in free demand, may find on its arrival that the demand has ceased; but to meet his engagements he must sell his cargo for what it will fetch.

There is another large class of circumstances which go to make the friction we have spoken of, which arises from the unwillingness of many persons to change their habits or occupations. A tradesman or workman, whose dogged and uninstructed perseverance in his calling has at once made him comfortable and fixed firmly his modes of acting and thinking, will sometimes scarcely listen to any thing which is going on out of his own immediate

business: if by chance his attention is caught for a moment by distant matters, he quickly turns away with the thought that they are nothing to him; and thus he continues in his old course, until long after changes have taken place which ought to have warned him to abandon it, and at last it is mere impossibility of proceeding that brings him to a stand. Many of these men are very estimable in all their relations; in quiet and stable times they are amongst the most happy of the people; but they suffer greatly from changes, and their inertia tends to increase the effect of changes on prices.

The same aggravation of consequences occurs when a demand takes place for which the means of supply do not exist, or require time to bring them into action. In almost every case the effect of this friction is to increase the variations of price; and any artificial arrangements which increase this friction, that is, which diminish the speed and accuracy with which the supply accommodates itself to the demand, increase the variations of price.

We introduce this consideration for the purpose of showing that, although the principles we have laid down do govern in the main the range of prices, there are disturbing circumstances which prevent the variations from being exactly those due to the amount and intensity of the actual variations of supply and demand; and that, therefore, observed departures from the simple consequences of those principles are not to be taken, without further consideration, as proofs of the incorrectness or inapplicability of the principles.

We must now notice another important principle. An increased price of an article commonly produces a diminished demand for it, the increase of price cutting off those customers whose means enabled or whose inclination induced them but just to give the old price. But if it be true, as shown above, that a diminished demand produces a diminished price, and that an increased price produces a diminished demand, it is not true that in every kind of article the changes of demand and of price will be to each other in the same ratio. For instance, a rise of 20 per cent. in silks might induce many persons to content themselves with cottons instead of them; but a rise of 20 per cent. in bread would induce very few persons to stint their children in their food. And so of other things. The effect depends upon the judgment the bulk of the consumers have formed of the comparative essentiality of the article in question.

Articles, therefore, of first necessity, or, what is nearly the same thing, which are required by the most confirmed class of habits, suffer least in the demand from an increase of price. Of two things which together are unattainable, the least necessary (judging of necessity by the habits of the consumer) will be sacrificed.

Now, let us suppose a simultaneous and equal rise in the price of food and of clothing. It is clear that the demand for clothing will be more diminished by the rise than the price of food, as being at any particular moment a matter of less indispensable purchase, and the demand for the labour employed in making clothing will be reduced by the change; the price of that labour will consequently fall, relatively to the price of food. And so of the rent of houses. Persons whose income above the cost of food is reduced by the increased price of food, must and will make shift with worse houses than before, or parts of houses, and the diminished demand will bring down rent.

But if the increased price of food go into the pockets of the growers of food, will those growers give a better price for clothing? No man gives a better price for an article just because he can give a better price; he gives only the least the seller is willing to take for it, and that is determined, not by the ability of the buyer, but by the seller's competition with other sellers. The grower of food may, indeed, use and buy more clothing, and thus increase the demand, to the relief, in some measure, of the competition of the sellers of clothing amongst themselves; but this can take place only after a time, and in a slight degree, and in the mean time the excess of labour for the present demand has greatly lowered the price.

If the increased income of the grower of food were all laid out in current expenses of whatever kind, and there were no friction in society, so that every person could at once accommodate himself to supplying the kind of labour which happened to be in request — that is, if the farmer laid by no saving, and the working man could one week be printing calicoes in Manchester, the next currying hunters at Melton, the week after cutting drains in Essex, and then acting as stoker in a Channel steamboat, it might be of less importance to wages, whether food advanced in price or not — the sum total of the demand for labour would, in general, nearly correspond with the sum total of the supply of it. But fixed as the greater part of mankind must be each to his occupation, a rise in the price of food inflicts dreadful suffering on many who are employed in furnishing only the conveniencies and elegancies of life.

Another view may render this matter still clearer. Let us suppose the price of food to advance, and the total increase of price to be laid out in additional clothing. Because the price of food is advanced, the working man must either go with less clothing himself, or work more diligently to earn the increased price of food. In the first case he diminishes the demand for clothing, and consequently the value of his own labour: in the second, he supplies a greater quantity of clothing to the market, and thus counteracts the effect of the increased demand of the farmer.

Again: suppose he receives back from

the farmer the identical amount for additional clothing which he now pays more than before for his food. It is clear, that, in comparison with former times, he now earns that additional money twice over; that is, he gives twice as much work for it as before.

We have put this subject in a variety of views, which are each of them, to a certain extent, partial and incomplete; for it is scarcely possible to combine in one enunciation all the circumstances and effects of this most important question. Every view of the subject, and each of its consequences, will, however, be found to be, in one way or other, dependent on these two principles: viz. that price is the result of the proportion between supply and demand, and that food is the article which must be had before all others.

It will be observed, that much evil is traced to changes in the price of food. A permanently high price, though a grievous evil, would be in time less injurious than greatly fluctuating prices. The standard at which men are contented depends upon what they are or have been accustomed to; and if food had constantly been permanently dear in any country, habits would have been formed requiring a less outlay on other things, and the population would have been only of such an amount as could be maintained upon food of high price. But a series of years of cheap food, and consequent abundant employment, brings into action a tendency to enjoyment, and projects and enterprises which largely involve the population in the supplying of the physical materials of enjoyment. A dear year or two deranges all those enterprises; and those who had become fixed in a course of industry dependent on the former natural and happy course of things, are at once rendered useless, dependent, and miserable. The natural defence against change of price is, the extent of the source of supply.

We have said that an increased price produces a diminished demand, and diminished demand produces a diminished price. This assertion has, at first, a somewhat paradoxical appearance. It is, however, not only true, but very important. A price artificially enhanced produces an effect very different from that of a price raised by demand; and the former is subject to very different laws from those which govern the latter. The artificial arrangements which may be designed to keep up the price of an article, do not and cannot affect all or even many of the circumstances which produce a demand for it, or which prevent other articles from coming into competition with it. A price founded on demand alone rests on a variety of circumstances, some or all of which must change greatly before the demand can be much affected. If clothing were dearer by act of law, coats would be worn twice as long by the upper classes as they now are before they would be thrown aside, and a new material, which would supersede wool, would, if offered, soon come into general use. The present price of woollen cloths is the consequence of demand founded solely on habits, and habits must greatly change before the demand for them by the upper ranks of English society can greatly vary.

This is true to a great extent of corn, but in a somewhat different way. Many articles of food can be substituted for it, and many persons can and will go to countries where they can live more cheaply; besides many, very many, consume much less food when it is dear than nature requires. Law cannot create a market, although it may decree a price: accordingly, all laws which have fixed the prices of food have sooner or later been abandoned. The corn laws of England have been repeatedly altered; and it has often happened that the change of prices after the passing of a corn law has been just the opposite of that intended. If it were not for the friction of society, emigration would take place from England, until the remaining population was so thin as to bring the price of living down to the level of the countries to which, on the whole, our population might be disposed to go. Continued pressure of artificial price is gradually overcoming this friction. The operation of the English corn laws is to obtain a profit by pressure in the mean time; a pressure which is at once producing great misery to those subjected to it, and preparing disastrous reaction to the interests of those who now profit by it.

Let us suppose a free communication opened between two countries, one of which has plenty of land but small capital and population, and the other has just the reverse. The food of the poorer country will be cheap and exportable to a profit, and to a certain extent, to the richer one: its industry, already directed to agriculture, will be expended in the improvement of it, under the stimulus of, and supported by the means afforded by, the better prices obtained for its produce; and this state of things will continue, without material interruption (if law does not interfere), so long as the poorer country can obtain from the richer the articles rendered necessary by their improved circumstances. In the mean time, the richer country improves and extends its products under the excitement of the new demand. No stop to this course can be seen, until the soil of the poorer country has occupied all it can occupy of its increasing population and capital. Interest and the price of labour beginning then to sink, employment must be sought in manufactures, but the richer country would long keep the lead. The growers of food in the richer country would profit by the certainty of their market; no harvest could be redundant, and the unavoidable cost of transport would form a natural bounty in their favour.

Now, let the richer country shut up this free communication. Capital and labour

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would soon become redundant in the poorer country, and food disproportionately high in the richer one. Manufactures must be resorted to in the poor country some generations sooner than they would have been, and the difficulty of living by labour in the rich one would send away, first the skilled artisans to set manufactures agoing abroad, and then the bulk of those which the land did not employ. Capital is of no country, and will transfer itself to the most profitable seats of industry. The land alone, and its bare population, remains of what was once the richer country.

It has been seen that an increased demand occasions an increased price, until the increased price produces an increased production. It has been supposed that an increased price, however produced, will occasion increased production, and on this supposition rests the protective system. But it is not so: the effect depends on the increased price being a consequence of increased demand; if it be produced artificially, the increased production does not permanently follow; and for this reason, the demand under the artificial price is liable to great variations from small and uncontrollable causes, and therefore the producers do not and cannot accumulate the means of extending the production, nor dare they do it if they could. But the natural demand, and the price consequent upon it, rest on habit and extensive usage, and is much less liable to variation. Accordingly, nearly all manufactures have extended themselves when their protection has been removed. And so would it doubtless be with the English growth of corn; the constancy of the demand, and the resulting certainty of price, would render the operations of the farmer safe, and induce him to carry on improvements which he now neither can nor dare undertake.

THE PRACTICAL DIFFERENCE, OR NATURAL CONSEQUENCES OF THE MONOPOLY SYSTEM.

Almost every article of food in general consumption costs the working classes of England a much higher price than the working classes of any other country in the world. A day's voyage by steam will convey a family from London to Ostend, Rotterdam, or Hamburg, and at each of these places they will find the best description of wheaten bread sold at half, or less than half, the price which they have been accustomed to pay for it in London. The best wheaten bread is sold in London for tenpence the quartern loaf. The French loaf costs about sixpence halfpenny; but as it weighs more than the London loaf, the price of bread in France must be calculated at the rate of about fivepence halfpenny for the English quartern loaf. The best wheaten bread sold in France is, however, of a very superior quality, and little used except by the wealthier classes; the second quality of bread is an excellent article, is used much more generally, and is sold at less than fourpence farthing a loaf. The price of bread varies a little in different parts of France, but the difference between the dearest and the cheapest town is not probably at the present moment more than one farthing in the loaf. It is by the Corn Laws, which prohibit the importation of foreign corn into England, that the poor man in London is prevented from buying the finest bread at fivepence halfpenny a loaf, and every Englishman, not an owner of land, may calculate that on every loaf consumed in his family he pays a tax of fourpence halfpenny—not to the state, but to the landed aristocracy. At a late public meeting at Bristol, Mr. H. G. Fowler, the French consul at that port, stated that at Leghorn bread was sold at three farthings a pound, as good as Nelson's sailors had at Trafalgar, or Stopford's at Acre. We in England pay twopence halfpenny.

The injurious effects of the monopoly of the supply of provisions possessed by the proprietors of land in England are, however, still more remarkably exemplified in the case of animal food; and naturally so, for whereas corn is allowed to be imported from abroad, when the home prices get very high, the importation of both live stock and fresh meat is at all times, and under all circumstances, positively prohibited. The best fresh beef is retailed in Hamburg at 4½*d.* per pound, in London at 9*d.* The best fresh mutton is retailed in Hamburg at 4*d.*, and in London at 8*d.*; but it must not be forgotten that the mutton is of an inferior quality in Hamburg, which is not the case with beef. The best fresh pork is retailed in Hamburg at 4½*d.* per pound, and in London at 9*d.* In New York, the prices of fresh meat, though in general somewhat higher than in Hamburg, are considerably lower than in London. The best beef at New York costs 12 cents, or 6*d.* per pound, and the best mutton 5*d.* Pork is retailed in New York at 6 cents, or 3*d.* per pound, which is less than is charged for it either in London or in Hamburg. An ox, in London, fit for making into India beef, weighing about 700 pounds without the offal, will cost about 25*l.*; the same description of ox, fattened in Holstein, would cost in Hamburg about 12*l.* in autumn, and about 15*l.* in spring.

Meat in a *cured* state is allowed to be imported, but at so high a rate of duty (12*s.* per cwt.) as to have but little effect on the home prices. Cured India beef of the first quality may be bought at Hamburg for 5*l.* 15*s.* the tierce of 336 pounds, while for the same quality 8*l.* is charged in London. The best cured beef is, therefore, 30 per cent. dearer in London than in Hamburg; and a merchant victualling a ship in Hamburg may buy 5,843 lbs. of the finest cured beef for 100*l.*, whereas in London he can only buy 4,200 lbs. for the same money. Mess beef, of a secondary quality, but more generally used for victualling ships, costs 4*l.* 7*s.* 6*d.* the tierce in Hamburg, and 6*l.* 7*s.* 6*d.* in London. India pork costs 5*l.* 6*s.* the tierce in Hamburg, and 7*l.* 17*s.* 6*d.* in

London. Mess pork costs 2*l.* 8*s.* the barrel in Hamburg, and 4*l.* 5*s.* in London.

Bread and meat, however, are not the only articles which are enhanced in price by an oppressive monopoly law. The best white Brazil sugar is retailed in Hamburg at 7*d.* per pound, and the best brown sugar at 5*d.* Coffee of a superior quality may be bought there in every grocer's shop for 6*d.* per pound, or roasted for 12*d*; but it is very unusual in Germany for any family to buy roasted coffee, the process of roasting being a very simple one. Small Bordeaux wine is retailed at 8*d.* a bottle; and St. Julien, quite as good as is often found in England at the tables of the wealthy, may be had in Hamburg for 12*d.* or 16*d.* a bottle. Families who can afford to buy wine by the cask have it, of course, much cheaper, and a similar remark applies to coffee and sugar; but we are here speaking of the retail prices, at which alone the labouring classes can purchase. Many articles of food, which here are deemed articles of luxury, are not beyond a poor man's reach in Hamburg. A good pair of fowls may often be bought for 1*s.* 6*d*, and it must be a remarkably fine pair for which 2*s.* 6*d.* would be thought dear at 3*s.*

Cattle might be conveyed by steamers from Holstein to England at very little expense; and if a small fixed duty were levied, a new source of revenue would be opened. At present, the high price of meat is profitable only to our wealthy landowners; for the importation of live stock and fresh meat being strictly prohibited, the state derives no advantage from the tax of a hundred per cent., which every labourer in England is made to pay upon every joint of meat that he buys.

But how long is it expected that the working classes of England will submit to such taxation? We may rest assured, only until they can emancipate themselves from it, and no longer, either by emigration to other countries, or by availing themselves of such legal and constitutional means as they possess to bring about a better order of things.

NECESSARY CONNECTION BETWEEN THE PRICE OF FOOD AND THE PROGRESS OF PAUPERISM.

[Compiled from Parliamentary Returns.]

Years.	Wheat per Quarter.		Amount of Poor Rate.
	s.	*d.*	£
1748	25	1	730,107
1749	29	4	
1750	29	4	
1776	37	6	1,720,317
1783	50	0	2,167,750
1784	43	1	
1785	43	10	
1803	58	9	5,348,205
1813	106	1	8,646,841
1814	91	11	8,388,974
1815	74	3	7,457,676
1816	63	8	6,957,000
1817	81	4	8,128,000
1818*	88	3	9,320,000
1819	81	3	8,932,000
1821	63	8	8,411,895
1824	47	8	6,836,505
1828	55	8	7,715,055
1832	63	4	8,622,920
1833	57	3	8,6[illegible]6,501
1834	51	11	8,338,079
1835	44	2	7,373,807
1836*	39	5	6,554,538
1837†	52	6	5,294,566
1838	55	3	5,186,589
1839†	69	4	5,866,000

* It is worthy of note that from 1818 to 1836 the population had increased by at least four millions and a half; and yet such was the effect of cheap bread that the poor rates were three millions less in the latter than in the former year.

† The action of the new poor law was first fully evolved this year; but it will be seen, on comparing one *new poor law* year with another, that a difference of 17*s.* per quarter in the price of wheat raised the rates 600,000*l.*

EXPORTATION OF ENGLISH MACHINERY AND PROGRESS OF FOREIGN MACHINE MAKING.

In the Session of 1824, a Select Committee of the House of Commons was appointed, "to enquire into the State of the Law and its Consequences respecting the Exportation of Tools and Machinery, and into the State of the Law and its Effects so far as relates to the Combination of Workmen and others to raise Wages, or to regulate the Wages and Hours of working, and to report their Opinions and Observations thereon." In compliance with the recommendation of that Committee, the Combination Laws were repealed, and the restraints on the emigration of artisans were removed; whilst, as to machinery, the Committee resolved that further inquiry, and a more complete investigation, should take place before that important subject could be satisfactorily decided.

Accordingly, in the following Session of 1825, a Committee was appointed, "to enquire into the State of the Law and its Consequences with respect to the Exportation of Tools and Machinery." After taking evidence on the subject, from which it appeared that a practice had prevailed of allowing, by licence from the Privy Council, the export of certain machines, then,

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as now, prohibited by law, the Committee reported, that although impressed with the opinion that tools and machinery should be regulated on the same principles as other articles of manufacture, yet, inasmuch as there existed objections in the minds of many manufacturers, it was expedient that, until an alteration could be made in the laws, the Council should continue to exercise their discretion in permitting the exportation of all such tools and machines then prohibited, as might appear to them not likely to be prejudicial to the trade or manufactures of the United Kingdom.

The law still remains on this footing; but early in 1841 a Select Committee was appointed by the House of Commons, "to enquire into the Operation of the existing Laws affecting the Exportation of Machinery;" and this Committee, after another long investigation into the subject, have recommended (11th June, 1841,) "that the laws should be repealed, and the trade of machine-making placed on the same footing as other departments of British industry." From the evidence on which this recommendation is founded, we glean the following facts and opinions:—

J. D. Hume, Esq. examined: Was 38 years in the Customs, and 11 years at the Board of Trade. Both before and since 1825, the Treasury has exercised a discretionary power of relaxing, to some extent, the rigour of the law. This power of relaxation, in revenue cases, is understood to attach constitutionally to the functions of the Lord High Treasurer: it is always exercised under the advice of the Board of Trade. When the law was revised in 1825, it was understood that, as occasion might arise, its stringency would be relaxed by the exercise of this power of the Treasury. It would be much better that the practice should be determined by statute, since it would be better known; all parties would stand on the same footing, and the frauds of agents prevented. From the misrepresentations of agents, it has been wrongfully supposed that there is caprice and favouritism in the granting of licences, which is not the case. There is a fee of two guineas to the Treasury for the order, but none to the Board of Trade. When seizures have been made of machinery in course of exportation without licence, no indulgence has been shown to its owners, since, if it were exportable, they might have a licence. No objection has been made by the manufacturing interest to the practice of the Board of Trade.

It being expected that the practice of the Board of Trade would become law, he (Mr. Hume) was at pains to make it systematic. The principle adopted is this:—Machinery, which merely operates on a mass of fibrous substance, is licensed for exportation; but licences are refused for that of any step subsequent to the very first division of it into parts for spinning. The law has never stopped machines for making machines: to have done so would probably have occasioned the removal of the whole prohibition. Card-making machinery may be exported: the cards themselves may not. Blocks and materials for calico-printing, though legally prohibited, are licensed for exportation. If the system were more rigidly enforced, more would be smuggled. It is almost impossible to prevent the exportation of the finer and more important parts of prohibited machinery. There is no search for any other purpose of ships going outwards. To prevent totally the exportation would require an express establishment. Machinery is the only article whose exportation is prohibited, and there are only very small export duties left. The prohibition of the export of wool, one of the oldest, was abolished in 1825, at which time the old law, which prevented the emigration of artisans, was repealed. It is not at all probable that custom-house officers in general, being appointed with a view to other purposes, and therefore selected on account of other qualifications, should be able to ascertain what is prohibited, and what exportable, machinery. This law, being so difficult of execution, ought for that reason to be repealed. Maps and plans are exported, and workmen freely go. Foreign manufacturers do also, by some means, get English machinery. To permit, therefore, the free exportation of our machinery could facilitate but little more the progress of foreign manufactures. The removal of the prohibition might, in a trifling degree, be adverse to our manufactures; but it is too frail a defence to be worth any thing in an enlarged view of the subject. If the produce of their labour could be exported, our machine-makers would remain at home. To be the machine-makers of the world (as we then probably should be) would be much better for us than to retain the very small advantage which our manufacturers could at the utmost derive from refusing our machinery to foreigners. The hardship on our machine-makers is much greater than the benefit to our manufacturers; and our machine-makers are the greater consideration of the two. This relaxation ought to have taken place at the Peace, when we should have well considered and determined on our future commercial policy; then its effect would have been certain; now some other countries, hoping to become machine-makers, may reject our machinery. Other countries are already levying a considerable import duty on our machinery, and they, perhaps, may raise it if we take off our prohibition. There is a considerable duty on the import of steam engines into France. If any country could compete with us, it would be Belgium and some parts of Prussia. But no country in Europe could compete with us without the help of prohibition: a manufacture of machinery, raised by such means, would be confined to its own home market, and would be a

forced, unnatural, and precarious interest. If they prohibited our machinery, they would, in some measure, carry out the professed objects of our present law; but the effect would be restrained by smuggling, and our artisans would not feel so much confidence in the continuance of high wages abroad as to induce them to go there to work. Perfect freedom is best. It is better for us to know at once our strength, in comparison with that of other countries, as to the production of any particular article, than to rear interests behind artificial defences, which must necessarily soon give way. If our commercial system were perfectly free in every respect, we should retain our superiority for ages, even if the continent of Europe had every tool we have, and any number of our artisans. We ought to admit both corn and timber: we have metals and coals, we want timber; and (leaving out of view our own conduct with regard to corn) our folly in rejecting it is only equalled by that of France in rejecting iron. By refusing foreign iron, France helps the competition of other countries against all the rest of her own manufactures. No other country prohibits the exportation of machinery. We have imported a steam engine from America; it paid duty here (simply a revenue duty) as a thing not specifically mentioned by the law.

Mr. Hames, *Mr. Ride*, and *Mr. Watson* examined: Have been searchers in the customs; the two former for 30, and the latter for 18 years. Machinery brought for shipment with a Treasury order, is often found to be of a different kind from that described: when this is suspected, the officers consult books, and failing to be satisfied, report to the Board, that engineers may be called in. Sometimes machinery is sent in parts, which adds much to the difficulty; sometimes part is exported at one port and part at another. The finest parts are often concealed in bales, and very frequently in passengers' luggage. Not unfrequently it is sent to the outports, and carried off in fishing vessels. In the haste with which steamers usually load and clear out, it is very difficult to examine all the packages with care.

The Chairman of the Board of Customs, and three searchers, fully supported Mr. Hume's evidence as to the extreme difficulty of enforcing the law. *Mr. E. H. Patten*, a licensed customs agent of 28 years' standing, and many of the other witnesses, gave instances of the facility with which the law is evaded.

The evidence of the other witnesses abounds with facts illustrating the state and progress of foreign manufactures, from which, however, our limits only permit us to select the following: —

English workmen take higher wages than foreigners, but their work costs less. In cotton-spinning in France a man will spin on only one mule, here he spins on two: in puddling iron, from 200 kilogs. of pigs a real good English puddler draws 180 of puddled iron, but a Belgian not more than 165 or 160, or even as low as 156; an Englishman does seven heats in the same time, and with the same coal, as a Belgian does six. In cotton-spinning, Englishmen have been known for month after month to get 3*l.* or 4*l.* per week at the same prices by which a Frenchman has earned but 18 or 20 francs. English workmen are much employed abroad, but foreign establishments are doing without them as much as they can.

Machine-making has greatly improved in Belgium since 1838. It seems probable that if it improve as much in the next three years as it has done in the last, it will be perfectly indifferent whether we repeal our law or not. Joint stock companies some time ago gave an artificial stimulus to Belgian manufactures; and as machinery could not be had from England, companies of the same kind were formed for its production: the consequence is, that Belgium has now more machine-makers than she wants, who obtain employment by exporting machinery to Spain, Turkey, other parts of the continent of Europe, Egypt, and North and South America.

Belgian machinery is of good quality. It is from 15 to 25 per cent. dearer than English; but as package, carriage, and duty commonly amount to about 30 per cent., it is 15 per cent. cheaper in Belgium to buy machinery made there than to procure it from England.

English steam engines are going out of repute on the Continent; for, fuel being for the most part plentiful here, the English manufacturers have not paid sufficient attention to the plans which effect economy of fuel, a point of very great importance to continental manufacturers.

In France, machinery costs 25 or 30 per cent. more than in England, and is not nearly so good, but is rapidly improving. At Aix-la-Chapelle, Cologne, Zurich, &c. there are manufactories of machinery of various prices and qualities, at most of which Englishmen are employed. No country besides England forbids the exportation of machinery. Most countries levy an import duty on it, with a view to encourage the making of it at home.

English lathes, planing machines, files, and tools in general, are much superior to foreign. These are exportable, and are largely exported; the facility of procuring them has kept foreigners from improving their own. The same remark holds with respect to steamboat engines.

France and Belgium have commissioners travelling in other countries to gather information as to their progress and improvement. The French commissioners are constantly employed in this business: those of Belgium are sent out only on special occasions. The best tools, and single machines on the newest plans, are constantly obtained from this country, and, with the

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help of picked English workmen, are immediately copied.

There is no reason to fear the rivalry of the continent of Europe if our laws be promptly altered; but foreign manufactures, and particularly foreign machine-making, are progressing so rapidly in the course into which we have driven them, that our proceedings must be very prompt in order to retain our advantages. Our improvements are always very soon obtained by foreign manufacturers.

The United States supply themselves with machinery: very little is imported from England; some they export. They obtain English tools, on which they pay 30 per cent. duty. On machinery the duty is 45 per cent. Their manufacture of machinery has been created by the English prohibition. The Americans generally are not so systematic in the internal economy of their factories as the English are, nor do they stick so close to their work. They have agents here to procure knowledge of new inventions. Generally speaking, English artisans are not well used in America. Machinery is very much more expensive there than here, and English labour is more productive, in proportion to its cost, than American.

The removal of the prohibition to export machinery is chiefly opposed by the bobbin-net manufacturers of Nottingham. France prohibits the import of English lace, and is increasing her own manufacture. They fear, therefore, that to allow France to obtain our machinery will in time destroy our trade altogether. Besides, they say, much more is earned in working a machine during its existence, than in making and selling it, once for all. In 1823 there were but 100 bobbin-net machines in France; in 1833 there were 1850 of the same kind, chiefly made in France.

The hosiery trade of Saxony competes with the English in the finer description of goods, but cannot bring coarse stockings into the market in opposition to those made in Leicestershire.

Mr. Emerson Tennent, M.P., who went abroad for the express purpose of ascertaining the state of foreign manufactures, being examined, says: — "I found at Berlin the most enterprising and systematic exertions made on the part of the government to obtain a command of the manufacture of machinery; I found no expense spared for that purpose; and the exertions quite astonished me. There is one very important institution at Berlin, called the 'Gewerbe Institut,' which is a large establishment for practical education, combining design, with almost every branch of manufactures into which science and mechanics enter. The pupils for this institution are selected from similar provincial schools throughout Prussia, and they are sent as a mark of honour to the head institution at Berlin, where they obtain their education, and are likewise even paid a salary during the period of their attendance. In going through the rooms of this institution with the professor, Mr. Wedding, I saw suites of apartments completely filled with models of English machines: the professor informed me that they had in it models of every machine in use in Great Britain for the manufacture of cotton, flax, silk, and wool, and likewise a number from America and Germany; that by these means they were not only enabled to have our recent improvements, but, what was a matter of importance which we cannot command, that they were enabled frequently to combine in the same machine two distinct English patents. The system, he told me, was, that this machinery, as soon as produced in England, was immediately imported at the expense of the government, and set up at the Gewerbe Institut; that it was proved; that a working model was immediately made from it, to be deposited in the institution, and that the original was presented as an honorary prize by the government to some manufacturer in Prussia, who had distinguished himself in the peculiar branch to which it was applicable. In the Institute, likewise, the pupils were taught to make the machinery themselves; they were supplied with the tools, and they were permitted to carry away the machines which they themselves had constructed." "Those who were pupils in this institution," he adds, "have commenced the manufacture of machinery in all the districts of Prussia from north-east to south-west."

Mr. E. Tennent, speaking of the Saxon operatives, adds, "The use of the power-loom is so imperfect in their hands, that it becomes a much dearer instrument of production than the hand-loom itself. One calculation which I had given to me was, that cloth which could be woven by the power-loom in England for 15 groschen, which is about 1*s.* 10½*d.*, would cost by the hand-loom in Saxony 2*s.* 3*d.*, and could not be produced by the power-loom in Saxony for less than 3*s.* 8*d.*; and I was informed in Chemnitz, that many use the power-loom, and are still so inexpert, that the same labour that in Manchester produces 18 pieces in the week, would not from the same loom produce in Saxony more than from four to five. Those circumstances, and the cheapness of labour, account for the hand-looms maintaining their ground in Saxony, in spite of the improvements in machinery elsewhere." "And at Chemnitz," Mr. Tennent adds, "I actually saw machines of English construction standing idle in the workshops of calico-printers, who stated to me that they were unable to employ them to advantage, and that they found it cheaper to continue the old system of hand-labour."

Several manufacturers (cotton and flax spinners chiefly) gave evidence against the repeal of the prohibition to export machinery; each declared himself, however, an advocate of free trade in the abstract. The reasons on which their opposition was

founded were chiefly of a temporary or partial character. Generally, they thought that the application of the principles of free trade should commence with our own importation of food, and end with our exportation of machinery. Mr. Westhead was the most energetic upholder of the present system; he even proposed to license makers of machinery, and to adopt other measures for preventing its exportation, and the emigration of artisans.

The Nottingham manufacturers, as well as Mr. Westhead, deny the impracticability of executing the present law, as affirmed by Mr. Hume and other witnesses, and refer to the supposed effects of the vigilance of a committee formed at Nottingham for preventing the exportation of bobbin-net machinery. It is, however, within the knowledge of the writer of this article, that after the alarm of the first few weeks had subsided, the exertions of that committee put very little difficulty in the way of exporting the insides of such machines. The additional risk of seizure did not amount to 5 per cent., and the only increased expense was that of carriage by a circuitous route. Of very many private friends, applied to for permission to use their addresses for cover to the transit, but one refused. The general feeling was, that it was a harsh and unjust interference of the law with the freedom of industry, and therefore persons of high general respectability and moral character willingly lent their aid to its evasion. The emigration of artisans has of late years diminished numerically, but is more injurious to English supremacy than formerly, since now they are only the very best workmen, and those capable of instructing and directing others, who go.

FREEDOM OF LABOUR.

Personal slavery existed in England until the reign of Charles the Second, and in Scotland (in the case of colliers) even down to as late a period as 1775. An ineffectual attempt was made in 1526 to abolish slavery in England. By various means, however, a considerable number of persons had become free labourers, and, as such, sought to exercise the right of selling their labour to the best advantage. A grievous pestilence in 1349 thinned their numbers, and, of course, their wages rose; but the "Statute of Labourers" enacted "that carters, ploughmen, shepherds, &c. should be content with the wages they had in the twentieth year of the King," (that is, two years before,) "and that their employers should pay them, if they pleased, in wheat at ten pence a bushel." The prices of other kinds of labour were also fixed by statute, and unemployed labourers were required to exhibit themselves publicly in market towns with their implements in their hands. Succeeding Parliaments repeatedly confirmed these enactments. In 1363, the diet and apparel of labourers were fixed by law; in 1388, servants were forbidden to remove from place to place; and, finally, justices of the peace were empowered to fix the price of labour every Easter and Michaelmas, by proclamation. The kind of cloth fixed on for the dress of labourers in husbandry was black russet at twelve pence a yard, clothiers being commanded to manufacture it, and tradesmen being compelled to have a sufficient stock on hand at legal prices. Before 1406, it was enacted that every person who had been employed in husbandry until he was twelve years of age, should continue in the like occupation all his life. To evade this statute, country persons frequently bound their children apprentices to handicraft trades before they were of the specified age; and to suppress this practice, it was further enacted that no person not possessed of land worth twenty shillings a year should bind any child apprentice to any trade or mystery within a city, but that children should be brought up in the occupation of their parents, or in other business suited to their condition. These and similar laws continued in force for many generations, and they seem to have originated in the attempts of the rural population to emancipate themselves from feudal servitude by engaging in the rising manufactures and commerce of the day. Freedom of effort and of exchange were effectually clogged, and the fearful disorders which consequently pervaded society may be judged of from the fact that 72,000 thousand thieves were hanged in England in the reign of Henry VIII.; a destruction of life which, on the scale of the present population of the country, would be represented by the execution of about 380 persons annually in each county. Laws equally unjust and impolitic were enforced in other countries of Europe, and, with the abuses consequent on the breaking up of the feudal system, and the abolition of old habits of submission brought about by the Reformation, they produced in many places great disturbances. In England, in the 5th of Elizabeth (1563), it was acknowledged that the old laws "could not be carried into execution without the great grief and burden of the poor labourer and hired man;" but no better device occurred to the lawmakers than to enact new scales of prices. How unwillingly labour was performed appears from a law of 5th Elizabeth, which punished with the stocks artificers who refused to assist in getting in the harvest. In the reign of James I., the powers of the justices were extended to *fixing the rate of wages* of "all labourers, weavers, spinsters, and workmen or workwomen, either by time or by

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the piece." So lately, even, as the 7th of George III. (1768), it was enacted that the hours of working of tailors within the city of London, and five miles thereof, shall be from six o'clock in the morning to seven in the evening, allowing an hour for refreshment; and that their wages shall be any sum *not exceeding* 2*s.* 7½*d.* per diem, except during a general mourning, when for a month they shall not exceed 5*s.* 7½*d.* Masters giving, or journeymen accepting, wages higher than allowed by the statute, might be sent to the house of correction.

The *law of apprenticeship* was for a long time another grievous restraint on the freedom of industry. The modern practice, probably, originated in the guilds or fraternities of workmen of the same occupation located in each city, which were themselves at once an organisation for defence against feudal encroachment, and a means of limiting the numbers to be employed in any particular calling. The practice existed before 1388, and was very common in the beginning of the succeeding century. Besides prescribing the number of apprentices which should be taken by each master, it had been the custom of many incorporated trades to admit none to the practice of their art who had not served a seven years' apprenticeship to it. The Act of 5th Elizabeth made this regulation the general law of the land, and so it remained for several generations. It may serve to show at once the hardship of the law, and the singular means by which unpopular laws are evaded, to remark that for a long time the courts of law lent all their cunning to the devising of interpretations by which the operation of the Act should be limited. Thus they decided, in spite of its obvious meaning, that it applied only to market towns; and they further determined that it referred only to trades in existence at the passing of the Act. A wheelwright, therefore, must have served his septennial apprenticeship, for wheels were in use before the Act was passed; but any man who could make coaches might become a coachmaker, for that was a new trade. However objectionable, in point of constitutional principle, this shuffling power of interpretation of the courts may be, it did much, practically, towards redressing the evils resulting from this vicious piece of legislation; just as smuggling, however liable to moral censure, averts, to some extent, the consequences of some other blunders of commercial law. Had not this irregular relaxation of the ancient strictness taken place, it is difficult to see how the most important arts of the present day could have come into existence. Names which have become immortal, and trades whose existence and purposes are beyond the very dreams of Elizabeth's sage counsellors, laugh to scorn the petty wisdom of these artificial restraints. At length, in 1814, on some advocates for the ancient quirks and contrivances petitioning that the law of apprenticeship should be more effectually enforced, the subject was inquired into, and the Act was repealed, so far as to give every person full liberty to exercise whatever trade he may choose, and to learn it as he please or can.

The expediency of an apprenticeship, as a means of becoming thoroughly instructed in any particular trade, is a distinct question, and one which now, happily, each person may discuss and settle for himself.

It rarely happens that, in any given spot, the demand for labour, and the supply of it, continue for long to bear the same relation to each other; one or the other becomes excessive or deficient. The best adjustment of the general supply to the general demand, will evidently be effected by each labourer fixing himself where, on the whole, he finds he can do the best for himself, and removing to a new locality when he judges a removal will benefit him. With the view, however, it is said, of restraining vagrancy, but much more probably of repressing a natural rise in the price of labour, several laws were passed in the fourteenth century, by which labourers were forbidden, under severe penalties, to wander from their usual places of abode; and, in the reign of Charles II., it was enacted, with the intention of remedying some irregularities in the administration of the poor laws, but with grievous effect on personal freedom and the due circulation of labour, that if within forty days after any person shall have come to occupy within any parish a tenement of less than 10*l.* annual rent, complaint of it shall be made to a justice of the peace by the parish officers, it shall be lawful for two justices to order the removal of the new comer "to the parish where he was last legally settled, either as a native, householder, sojourner, apprentice, or servant, for the space of forty days at the least." However the fact may be disguised by changing feudal lords for parish officers and justices of the peace, and feudal usages for parliament-made laws, there is no denying that, to live under a statute like this was a real and galling slavery. Like other unreasonable and obnoxious laws, it was probably much evaded, and was afterwards relaxed in effect, by the practice of granting certificates of legal settlement to persons who might be liable to the interference of the officers of any other parish in which they might reside; the certificate amounted, in fact, to an acknowledgment of legal liability on the part of the certifying parish to maintain the certificated person, and thus diminished the motives to removal on the part of any other parish in which the labourer might be residing. The granting of these certificates was, however, optional on the part of the parish officers, who, consequently, by refusing them, could, in many cases, almost peremptorily confine labourers within their own parish. This whole system is now happily abolished, and at present no person is legally remov-

ble to his settlement until he or his family becomes *actually* chargeable.

Among other modes of obtaining a legal settlement in a parish, was that by hiring and service. To be hired for a year, and to fulfil the engagement in legal fashion, transferred the settlement of the labourer from his former parish to that in which the service took place. The farmer, however, was unwilling to burthen his parish with additional settlements, and the labourer disliked to render himself liable to be passed hereafter to a place where he never had more than the transient connection of a year's service. Both parties, therefore, commonly evaded the law; and among various methods of doing so, was that of hiring only for fifty weeks: he was considered a bad neighbour who neglected this precaution. But when all had been done which could be done to break down the operation of the law, enough remained to obstruct materially the free circulation of labour. It might be, and frequently was, redundant in one parish and scarce in another, to the loss of all parties; but no equalisation could take place until the loss from this inequality more than counterbalanced that which arose from the artificial operation of the law of settlement. The Poor Law Amendment Act abolished, therefore, settlement by hiring and service, and so far restored freedom of labour.

Of a like destructive and injurious tendency are the usages of some cities and corporate towns, by which persons are forbidden to exercise certain trades therein except they have first become "free" of the corporation. It is easy to see the mischievous effects of this practice, and very difficult to find a party who benefits by it besides the functionaries who receive the fees of admission. The custody of estates and maintenance of convenient trade usages by some of them, will probably long furnish colourable argument enough for the continuance of the superannuated bodies, which bear the names of "trades and mysteries;" but that they should have power to compel all others to join *their* combinations is not a whit more reasonable than that workmen should be at liberty to force their fellows into *theirs*.

The *combination laws*, of the operation of which many of the existing generation have still a lively remembrance, subjected to severe penalties any parties who should associate for the purpose of raising or depressing wages. Practically, however, they operated only on the workmen; their employers, from their smaller numbers and different habits, could easily attain all the objects of combination without rendering themselves liable to prosecution. The obvious injustice of this one-sided restraint produced great exasperation and ill-will, and, as in other cases of vexatious interruption, by law, of the course which each individual of the community strongly thinks it is his right to follow if he please, secret associations were formed to a great extent, almost absolute power being given to the leaders, to whom implicit obedience was commonly and willingly paid. Habits of defiance of the law were thus engendered; and the course which began in secret combinations for the defence of conscious right against meddling law, often ended in hatred of all law, as law.

At length, even the employers — for whose benefit these laws were more especially intended — disclaimed their aid; and several of them gave important evidence before a Committee of the House of Commons in favour of their repeal. Accordingly, in 1824, the whole of these laws, amounting to upwards of thirty, of which the oldest was of the reign of Edward I., were swept from the Statute Book. The only law on this subject now existing is the very reasonable one which subjects to punishment any person who shall, by violence, threats, molestation, or obstruction, endeavour to force any workmen into a combination for controlling wages or the conduct of manufacture.

The last of the restraining laws we shall now notice, is that which prohibited *the emigration of artificers*. In practice, this most unjust law proved to be wholly useless. It was easy for artificers to leave the country in other characters, and even if they were known to be artificers, the custom-house officers doubted their own power to detain them, except proof existed that their purpose in going abroad was to teach or practise their arts. It seems to have happened here as in many other cases, that an innate sense of the injustice of the law relaxed the energies of its administrators to the lowest tension of official constraint. In other ways, too, the intention of the law was completely frustrated. Machinery of the kinds which might be exported, required, when sent abroad, that workmen also should go to fix it; and it rarely happened that these men could not give to foreigners important information as to the operations and machinery employed in British manufactures. Even prisoners of war have communicated arts by which some manufactures of this country have been superseded for continental use. The bobbin net trade of France was commenced by English adventurers who well understood the manufacture, and who emigrated several years before the repeal of the law. Those persons continued to be for a long time the most active and successful promoters of the manufacture in that country.

The law was repealed in 1824. The abolition of this unjust restraint has left in our law the anomaly, as impolitic as it is absurd, that machinery of many kinds may not be exported, although all the tools, and materials, and artisans required for its construction may freely go. But even Mr. Felkin, one of the most determined upholders of the existing law against the

exportation of machinery, admits, that to prevent the emigration of artisans, "is so great an infringement of personal liberty of action, that it would be out of the question to expect that any such return to restrictive policy in reference to workmen would be tolerated, or could be asked for."

It is impossible to review the history and operation of the laws which have for ages interfered with the free disposal of labour, without being struck not only with their general injustice, but with their short-sighted adaptedness merely to the visible pressure and accidental state of society at the moment. One of the greatest services perhaps which the manufacturing system which arose in the last century has done to mankind, has been to break down the artificial restraints by which labour and thought had been so long confined. Hereditary attachments and generations of faithful service, returned by kindly patronage, figure prettily in tales and speeches, and may have existed here and there in reality; but it is clear that the mass of men lived in a fretful and depressing restraint, which only the extraordinary stimulus supplied by the results of mechanical invention and the strength imparted by extended, though imperfect, education have enabled society to throw off. Now, as heretofore, social improvements begin in towns and manufactories, though the fancied scenes of social happiness are all laid in the country. The country, however, always learns the new methods in time, and, after a while, it stoutly defends as ancient institutions, the very laws which broke in upon and dispersed its own old habits and abuses.

THE TIMBER DUTIES; OR, HOW TO HAVE WOOD BAD AND DEAR.

The timber duties, like many similar imposts which are strongly defended, are of modern origin. Down to as late as the year 1809, there were no differential duties in favour of Canadian timber to the exclusion of the better timber of other transmarine countries; but political events then threatening to cut off our supplies from the North of Europe, the duties on Canadian and other colonial timber were almost entirely repealed, and those on timber from the North of Europe very much increased. It is difficult to comprehend the logic of this step; for if the accustomed European supply had continued, England would have been furnished with timber as before, without giving artificial encouragement to Canada; and if the European supply were not continued, the increase of the duty could not take effect; to which we may add, that the cessation of the European supply would have furnished of itself a sufficient encouragement to Canada by the rise of prices which must have followed. In the next year, however, the duty on Baltic timber was doubled, and, again, 25 per cent. was added in 1813, the whole amounting to 2*l.* 5*s.* per load; a striking instance of the eagerness with which a trade, when once protected, clings to and seeks to enlarge its factitious advantage.

In 1821 the evils of this system had become so glaring, that the duties on Baltic timber were diminished to 55*s.* per load, and a duty of 10*s.* was laid on that from Canada. In 1831 Lord Althorpe proposed to reduce the duties on Baltic timber 6*s.* per load in 1832, and to follow this with two other reductions of 6*s.* and 3*s.* each, respectively, in 1833 and 1834. The difference in favour of Canadian timber would still have been 30*s.* per load; but even this moderate measure was rejected by the House of Commons, and the duties now remain as above stated.

The importance to a manufacturing country of an abundant supply of good timber, on the cheapest possible terms, needs not the aid of argument. England has coal and iron, and virtually rejects wood. France, with almost equal folly, rejects iron.

It is said that Canada is not really benefited by this preference; that the "lumberers" employed in procuring the timber are rendered wild and lawless by the nature of their avocation; that not one tree in a hundred of those composing the forests of Canada is fit for exportation; and that when a tree is *cut* down, as practised by the "lumberers," instead of being burnt down, a growth of brushwood follows so great as to require more labour for the clearance of the ground for agriculture than would have been required by the original forest. Great part of the timber brought here, as that of Canada, is really the produce and cut by the citizens of the United States. A few mercantile establishments might, perhaps, suffer by the abolition of the differential duties, and so, perhaps, might the owners of a few ships, which, being too old and decayed for any other purpose, continue to be used in this trade. One year's advantage to the public would, however, more than counterbalance these losses; it would therefore be easy, if it were just and prudent, to pay off this opposition.

Canada timber is very inferior to that from the Baltic: it is softer, less durable, and more subject to the dry rot. Its use is consequently entirely discontinued in the navy. It is never used in the best buildings; and if used at all in dwelling-houses, it is in the houses of the poor, who are thus obliged to pay a higher rent to compensate for the earlier decay of the house. If two planks of it are laid one on the other, they will almost certainly, *in less than twelve months*, have the dry rot to a greater or less extent.

If the duties had been so managed as to admit timber from the North of Europe, and

yet that the price of timber should have been what it actually has been, the revenue would have gained considerably more than 1,500,000*l.* per annum; or, what comes nearly to the same thing, if the revenue had been content with the same amount from timber, the public would have saved 1,500,000*l.* per annum in the purchase of it.

Corn and timber are the only commodities some important countries have to give us in exchange for manufactured goods. To impose a burdensome tax on these commodities is the same thing as to tax our own manufactures; one measure would be followed by the same decline of intercourse which would distinguish the other. In 1809, when the discriminating timber duties were first imposed, 428,000 tons of British shipping entered inwards from the Baltic. In 1814, when some of the duties had been laid on, and the whole Baltic was open to our ships, the quantity had declined to 242,000 tons; in 1816 it was 181,000 tons; and, in 1819, it had not nearly recovered its amount ten years before, although shipping was largely employed in bringing corn to supply the deficiencies of the harvests in 1817 and 1818. In 1821 the number of English ships entering the port of Memel was not one fourth of the number during the war, and the number does not seem to have increased greatly since that time.

The importation of timber is less from Norway than it was twenty years ago; that of timber in the log has almost entirely ceased in Scotland. Considerable quantities of deals are brought, in consequence of the duty being lower on the same quantity of timber in deals than in the log; a sufficient evidence that the trade would extend largely under a better system. The result is, we lose the sawing of the timber, and it comes in sizes less convertible to our purposes than we might otherwise command. Our exports to Sweden do not exceed 160,000*l.*, to Norway they reach but 150,000*l.* per annum, and our imports are only about half that amount. The produce of Norway is admitted into Holland, and she therefore pays us the balance in bills on that country. This is not for want of a disposition to take our goods; for an opportunity occurring of offering us a new article, viz. rock moss, for making cudbear, they have sent us a considerable quantity, the proceeds of which have been laid out in Scotch manufactures. Twenty years ago, the sailors of Norway coming into an English port had "a land day" (a day of liberty from the ship), and they took that opportunity of laying out all their surplus wages in manufactured articles; but now they are obliged to get their manufactures chiefly from Germany, although they prefer ours.

Norwegian cottages are much better than those occupied by the same class of persons in this country, owing to the high price of timber here.

England, with cheap timber, and unrestricted choice of it, could build ships as cheaply as any country in the world. But at present English capital is largely engaged in foreign and colonial built ships. A ship may be had at Dantzic for about two thirds or three fourths of its price in Scotland. The North American Shipping Company, Pollock and Gilmour, have built thirty or forty ships of 700 to 1000 tons register; they had a strong attachment to the British build, and but for these duties, would now, most likely, have had every ship in their hands British built, whereas they have not one; their ships were built in the North American colonies.

The British fishing vessels are much inferior to French in size and construction, and precisely through the operation of the same duties.

Fifteen or sixteen years ago, an offer was made to the shipowners, by direction of Mr. Huskisson, that timber used in building ships should have a drawback *equal to the duty!* The offer was rejected, on the ground that it would lead to the building of cheaper ships, which would compete, with advantage, against the existing ones. This fact shows strongly the effect of artificial regulations in raising artificial interests which must eventually be abandoned. For fifteen years we have been building ships with dear timber, lest the old ships should find better rivals in the market; and for the same reason, if it be good for anything, we must continue to do so in all time to come.

THE COFFEE AND SUGAR DUTIES.

Coffee was first used, and the first coffee-house opened, in England, in 1652. In 1660, a duty of 4*d.* per gallon was laid on all coffee made and sold. Previously to 1732, the import duty was 2*s.* per pound; but it was, in that year, reduced to 1*s.* 6*d.*, producing, for many years, about 10,000*l.* per annum. Smuggling, however, reduced the revenue to 2869*l.* 10*s.* 10½*d.* in 1783; and in 1784 the duty was lowered to 6*d.* per pound, in consequence of which the revenue rose to 72001. 15*s.* 9*d.* In 1807, the duty was 1*s.* 8*d.* per pound; the quantity entered for home consumption was 1,170,164 lbs., and the revenue derived was 161,245*l.* 11*s.* 4*d.* In 1808, the duty was reduced from 1*s.* 8*d.* to 7*d.* per pound, and the revenue rose to 245,856*l.* 8*s.* 4*d.* In 1819, the duty was raised to 1*s.* per pound; the quantity entered for home consumption was 7,993,041 lbs., and the revenue 407,541*l.* 4*s.* 3*d.* In 1824 the duty was reduced to 6*d.*; and the quantity entered for home consumption in 1825 was 10,766,112 pounds, and, in 1831, it was 22,740,627 pounds, yielding a revenue of

583,751*l.* In 1839 the coffee entered for home consumption was 26,832,268 lbs., and the revenue amounted to 779,855*l.* The consumption under the present duty was, in 1838, for each individual, more than twenty times as great as it was in 1801, when the duty was three times its present amount; so that, although the duty is so much lower, each individual paid, at the latter period, more than six times as much tax on coffee as he did at the former.

The present duties on coffee are as follow: — On the produce of, and imported from, any British possession in America, or within the limits of the East India Company's charter, Sierra Leone, or Mauritius, 6*d.* per pound; imported from any British possession within the limits of the East India Company's charter, not being the produce thereof, 9*d.* per pound; imported from any other place within those limits, 1*s.* per pound; otherwise imported, 1*s.* 3*d.* per pound.

The Cape of Good Hope is within the limits of the East India Company's charter; no coffee is grown there; but coffee imported from that colony, whether grown there or not, pays a duty of 9*d.* per pound; though, if imported direct from the country producing it, the duty is 1*s.* 3*d.* per pound. Coffee, therefore, in large quantities, is carried from Brazil and the West Indies to the Cape of Good Hope, and then re-shipped for England. The cost of the extra voyage is not three farthings per pound, while the duty saved is 6*d.* But, of every 100 lbs. of coffee imported into England from this colony, 57 lbs. are from Brazil, 8 from Cuba, 12 foreign coffee *sent from England to be reimported from the Cape*, 6 from Java, 6 or 8 from Holland, and the remainder from other countries. At first, it might seem that this was a loss of duty, as well as a most absurd waste of labour and tax on the consumer; but, in reality, the increased consumption, from the cheapness thus effected, more than compensates for the diminished duty.

Rio Nunez was understood to be within the limits of the colony of Sierra Leone; accordingly, a duty of 6*d.* per pound was paid on coffee imported from thence, and a rising trade was established, the coffee being paid for by British manufactures. The West India interest complained of this, and the Colonial Office decided that Rio Nunez is not within the limits of Sierra Leone. The duty of 1*s.* 3*d.*, to which its coffee was thus subjected, has effectually destroyed our trade there. The Americans now take the coffee, and supply the natives with their manufactures, instead of us. For the sake of West India jealousy, England has thus thrown away a fine opportunity of improving her commerce, and of extending, in Africa, the blessings of civilisation.

Brazil produces more coffee than any other country: its natural quality is good, but much of it is, at present, spoiled for the British market by bad preparation, — a fault the growers are learning to avoid. Two thirds of the exportation of coffee from the Brazils is to the continent of Europe, nearly all the rest to the United States of America, and a little comes to England, by way of the Cape of Good Hope. The ships which carry it chiefly belong to continental countries, to the exclusion of ours; for British ships, having landed their cargoes of coffee in Europe, have no freight to England, as they might have if the corn trade were placed on a freer footing. They, therefore, cannot carry so cheaply as foreign ships can which are going home. Our high duties exclude Brazilian produce; and the consequence is, that, every year, increasing quantities of American and European manufactures are taken, to the exclusion of ours, — a state of things which, it is supposed, will be much aggravated in 1844, when the existing treaty of commerce with the Brazils expires. A similar state of things exists with reference to the commerce with Hayti.

The high price of coffee occasions adulteration to a large extent; the practice is increasing, and cannot be prevented. The general effect of the duties is to render coffee dearer by 80 or 100 per cent. than it is on the Continent, or than it would be here under more moderate duties and a more judicious system.

In the Committee of the House of Commons on Import Duties, in 1840, the chairman asked Mr. M'Gregor the following question: — "Then, are the Committee to understand that, by the present discriminating duties, the export of British manufactures is prevented from increasing; that the shipping of England has been superseded, in part, by the shipping of the north of Europe; and that the inhabitants of England are compelled to pay a higher rate, by 80 per cent., for the coffee they use, than the inhabitants of the Continent?" The answer was, "Yes, 80 to 100 per cent."

In 1834, the price of Ceylon coffee in London was from 48*s.* to 51*s.*, and that of Hayti was 51*s.* to 53*s.* (from which it appears that, in quality or adaptation to market, the Haytian coffee had a slight preference); and, in that year, the present discriminating duties were established. In the following year, the price of Ceylon coffee was 73*s.* to 76*s.*, and of Haytian 51*s.* to 53*s.* In July, 1840, Ceylon sold for 83*s.* or more, and Haytian for 44*s.* to 45*s.* This change of relative price is evidently the effect of the different duties; and to the amount of this difference of price does the British consumer pay more than he ought to do, besides the duty.

The charges on coffee before it reaches the consumer are nearly as follow: — Say the price of Jamaica coffee in bond is 114*s.*, — duty 56*s.*, and 5 per cent., making together 58*s.* 8*d.*; roasting, 2*s.* 6*d.* per cwt., and other petty expenses, 1*s.* 9*d.* per cwt. A hundred weight of raw coffee yields

only 92 lbs. when roasted. Adding brokerage and profits, genuine Jamaica coffee, when at 114*s.* in bond, cannot be retailed at less than half a crown a pound.

Sugar seems to have been used in England in very small quantities in the fourteenth and fifteenth centuries, honey being generally used for sweetening purposes. Early in the seventeenth the importation was yet inconsiderable. The growing use of tea and coffee in the latter part of that century first gave rise to a considerable consumption of sugar. In 1700, the quantity used was about 10,000 tons; in 1754, it amounted to 42,000 tons; and, in 1754, to 53,270 tons. In the reign of Queen Anne the duty was 3*s.* 5*d.* per cwt.; in 1780, it was 6*s.* 8*d.*; in 1787, it was raised to 12*s.* 4*d.*; and, in 1791, to 15*s.* After this time it was subjected to successive augmentations, until, in 1806, it reached 50*s.*; subject, however, to a remission of a shilling or two by the Lords of the Treasury, according to the state of the market. In 1825 the duty was made constant at 27*s.*; and in 1830 the present duties were established, which are 24*s.* per cwt. on West India, 32*s.* on East India, and 63*s.* on all foreign sugars. The importation in 1839 amounted to 3,908,495 cwt. of West India, with only 1705 cwt. of East India, and 66 cwt. of foreign. The duty of 63*s.* acted as an effectual prohibition until very lately. The duty, even on West India sugar, is at the enormous rate of 70 or 80 per cent. on its market value in bond. A cargo of 265 tons of Brazilian sugars arrived at Falmouth in July, 1840: they were as good as British plantation sugars then selling at 61*s.* the white, and 57*s.* the brown, both in bond; the owner would have sold his cargo at 25*s.* and 21*s.* respectively. The loss to the public on that cargo was about 940*l.*. Or, to put the comparison in another shape, this example shows that the British consumer was paying $3\frac{5}{8}d.$ per lb. more for sugar than he ought to do, *besides* the duty of 24*s.* per cwt., or $2\frac{1}{4}d.$ per lb. We consume one fifth of all the sugar produced in the world, and we confine our demand for it to our own West India Islands, which never produced more than that proportion of the total supply, and have latterly sent us much less. To such a pernicious extent has this absurd system operated, that foreign sugars have actually been used in England, although they pay 39*s.* per cwt. duty above that laid on our own.

Since the population of England is increasing, it is clear that the revenue on articles of daily and general consumption ought to increase also: but that derived from sugar has been no better than stationary for the last ten years. Calculating from its amount in 1829-30, it should now be nearly 6,000,000*l.* per annum; but it actually does not nearly reach 5,000,000*l.*

Every reduction in the price of sugar has been followed by a considerable increase of its use. Our own market furnishes abundant proofs of this assertion. A very remarkable fact of the same kind is mentioned by Mr. M'Gregor with respect to Austria. Down to 1838 a few licensed proprietors and dealers had long possessed an exclusive privilege of importing sugars. From a variety of circumstances, the supply through their medium became deficient; and, as in all cases of monopoly, the price was so enhanced that the government was constrained to abolish the monopoly and reduce the duty. The result is singularly instructive. The net revenue from sugar alone is now greater than the entire revenue from the customs was before.

Since, then, the inevitable effect of monopoly, and particularly of a monopoly (or preference, tantamount to monopoly) possessed by producers incapable of supplying the demand, is to increase the price to the consumer, and the quantity consumed diminishes as the price increases, it is clear that the revenue, strictly dependent as it is on consumption, must suffer from the preference. The extra price taken by the favoured West India planters is either directly so much which the revenue might have had; or, by diminishing the consumption, it is the means of diminishing the revenue. In continental countries, where there is no peculiar interest to protect, the governments are able to raise a greater revenue on sugar than can be obtained in England. It is but fair, however, to observe, that the West India interest are subjected by British law to great and burdensome restrictions on their commerce. We first make labour, provisions, and other indispensable supplies dearer to them than they would be but for our regulations, and then tax ourselves enormously in the price of their produce to compensate them for it!

The annual consumption of sugar in England is estimated by Mr. M'Culloch at 24 lbs. for each individual. Dr. Bowring says 17 1-10 lbs. The separate allowance to servants is 1 lb. each per week, or 52 lbs. per annum. In workhouses 84 lbs. per annum has been given. There can be no doubt that among the wealthy classes the consumption is much greater. Now, if these quantities be correctly stated, it follows that a large part of the working population use but a small quantity of sugar, and that a large increase would follow the diminution of price which would necessarily follow the abolition of the differential duties.

The consumption in France is little more than 4 3-10 lbs. per head per annum. In Paris, however, among the higher classes, the consumption is very much higher. It follows, therefore, that great part of the French people use little or none; and this is to be ascribed to the enormously high duties on colonial sugar, by which they have bolstered up the manufacture of the article from beet-root. The principle is the same as that of the English duty, but more stringently applied.

The consumption of the countries composing the German League is but 3 9-10 lbs.

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per head, and that of all Europe 5½ lbs. per head per annum. Many parts of Europe are yet in the same condition with respect to the use of sugar as England was a century ago.

It has been thought a matter of great importance to encourage in this country the business of sugar refining, and therefore it is forbidden to be practised in the West Indies. To promote an export trade in refined sugars, bounties were given, and it was endeavoured to proportion these to the duty paid on the quantity of raw sugar used. But the quantity used was necessarily an estimated quantity, and there is reason to conclude that for many years the bounty much exceeded the duty; and that, in fact, the excess was the only profit on which the trade existed. Since that period sugar for exportation has been refined in bond; and *foreign* sugar has been employed exclusively on account of the high price of British. Other countries have been as unreasonably eager to secure this branch of industry as we have. The English refiners would now be glad to agree that refining might be practised in the West Indies, if at the same time they were only permitted to obtain their sugars from the best market.

The Brazilian government, in particular, is much dissatisfied with our tariff on sugar and coffee, and is anxiously waiting an opportunity of breaking up the present treaty, which expires in 1844. At present our manufactures, to the amount of 5,000,000*l.* a-year, are imported into the Brazils, on duties not exceeding 15 per cent.; and it is stated to be the intention of the authorities of Rio de Janeiro to prohibit them entirely, if we do not alter our differential duties.

Since the commodities of Brazil and Hayti cannot be brought here to advantage, the ships which take out our manufactures cannot return with freight; they have to seek it in other ports, at a great distance, and at a great expense. Ships from other parts of Europe, where the produce of these countries is admitted on favourable terms, carry out their own manufactures, and return with coffee and sugar. Not one vessel in ten returns from Hayti direct. Out of forty-eight vessels from Liverpool to Rio Janeiro, not one returned. One went to Madras, and thence to Canton, and remained there for years.

There is stated to be great difficulty in getting returns from Brazil for English goods, simply because we do not admit Brazilian produce. When English shippers do exchange their cargoes for Brazilian produce, the only chance they have of disposing of it is to convey it to some other foreign country, where no such prohibitory system as ours prevails, at a great increase of risk, and diminution of profit to all concerned.

THE SUNDAY SCHOOL SYSTEM.

Some who have not examined at their sources the influences by which public opinion and public morality are formed, may be startled at the assertion that the character of the present age has been greatly, perhaps mainly, influenced by the establishment of Sunday Schools. We should not fear, if it were needful, to undertake the proof of this position; and in so doing, we should have to state facts, and describe habits and results, which many of the wealthy, and even of the barely well off, little suppose to exist about and among them.

No social changes have ever happened to the human race greater than those consequent on the inventions and improvements, physical and moral, which became public during the latter half of the last century. The first patents of Watt, Arkwright, and Wedgewood, were all taken out in 1769, and began to take effect on the state of society in ten or twelve years afterwards. In 1775 began the disputes with the American colonies, which ended in the triumph of new principles of government, and led to greater and wilder changes in France. During the whole period, questions of vital import to individual and social man were freely debated, and nothing was taken for a landmark without proof of its authority.

But events as great as these, simply as events, had taken place before. Colonies had beforetime separated from the mother country; inventions as great for their day had been published; debate had ransacked as freely before as in that day the widest and the deepest questions of politics, morals, and religion. But in no other day had the efforts of individual minds and the movements of the upper class of minds, produced effects on the mass of society at all comparable with those of the period of which we speak. The reason is not far to seek: heretofore, the few were readers — now, the whole people were readers; or, what comes nearly to the same thing, so many of the people read, that the whole took their tone on general questions from the press. No event accounts for this wider spread of the ability to read, but the establishment of Sunday Schools.

We might pursue this illustration by referring to the religious movement which commenced under Whitfield and the Wesleys. It was not the first movement of the kind, by many, which the church in its history had witnessed: even in the preceding century, many ministers had lived and laboured as zealously, and in the inculcation of nearly the same doctrines as they; but the effect in almost every previous case was evanescent as to the fervour excited, or the existence of a peculiar body professing and diffusing the views

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which animated the founders. If it were not so in the modern instance, it was, we believe, because the people then *could read*. John Wesley began his labours in 1730; his first chapel was built in London in 1749; he died in 1791. His zeal and prudence might have held the body of his followers together during his life; but had it followed the previous course of such matters, it would have dissolved ere now. That it has not done so, is, we conceive, chiefly because its promoters can make effectual use of the press.

The same remark applies to all, or nearly all, other religious bodies. A fervour and earnestness has come over many of them, derived from a few strong minds, but carried into every cranny and corner of society by the ability to read.

Science, politics, and pleasure, all partake of the same new character. Intensity is in them all. A few among our forefathers were, perhaps, individually stronger and more determined men than we are, but now the mass moves and is moved.

It is the fashion, we know, to expatiate on the want of education, and to describe a great part of the populace as ignorant even of the letters of the alphabet; but it is, in our humble judgment, a fashion much at variance with the truth.

We appeal from general assertions to facts. What has banished the "Ploughs," and "Black Lions," and "Geese and Gridirons," &c. from the shop-fronts of our tradesmen, and substituted the simple name and profession of the occupant? Clearly, ability to read on the part of the people. What leads every body to trust to a simple written caution on a wall, or the paddle-box of a steam-boat, or in any place of danger? The conviction, unquestionably, that almost every body can read. What justifies our law in affirming the sufficiency of service when a written or printed document is left or sent by post? Just the same belief in the prevalence of the ability to read. What fills every vacant space with placards on every subject, from the Opera House or the sale of manors to the three-penny ordinary or the penny pot of blacking? What keeps alive our sterling penny literature, our weekly giants of the stamped press, and the innumerable daily vehicles of news and controversy? But we might go on enumerating facts without end, which, tested by the state of society a century and a half ago, must be regarded as real novelties, however we may have become accustomed to them, and novelties brought upon us at first or second hand by Sunday Schools. The railroad is not a more pregnant characteristic of the times in which we live, than is the confidence with which one of its officials gives out a time-bill to a labourer who inquires the hours of departure.

We shall refer to only one more fact in proof of the general diffusion of the ability to read. A cry has been raised for more general education. In so far as the people have joined in it, that cry is itself a proof that a desire for extended education, of whatever quality, does exist. It takes some knowledge to make men aware of their ignorance. The cry did not exist in the last century, for men knew not the value of knowledge. They have now been taught to a certain point — far enough to know that more is to be known; and to Sunday Schools, imperfect, grievously imperfect, as many of them are, must be attributed the accomplishment of this first great step in our moral and social progress.

MECHANICS' INSTITUTIONS.

In the year 1796 a "Mechanics' Class" was added to the Royal Institution of London, at the instance of Mr. Webster, the eminent geologist, for the purpose of teaching working mechanics "the elementary principles of such portions of natural philosophy and chemistry as are most essential to their various trades;" but it never attained to more than a feeble infancy, and has long since ceased to exist. In 1800, Doctor Birkbeck engrafted, with more success, a class, under the same denomination, on the Andersonian Institution of Glasgow, which, though originally founded for the express purpose of diffusing scientific information among the trading and working classes, had not previously opened its doors to the humbler orders of operatives. Out of this class, subsequently, sprang the Glasgow Mechanics' Institution, which continues, to this day, one of the most flourishing establishments of the kind. In 1824, the "London Mechanics' Institution" was set on foot on the suggestion of the Editor of the *Mechanics' Magazine;* and this was the first institution in England bearing the distinctive title of "Mechanics," and having exclusively in view the benefit of the "mechanic" classes. The example of the metropolis was speedily followed by all the larger cities and towns throughout England. At the present time, the total number of Mechanics' Institutions, in Great Britain, is 216. The number of members is, however, we regret to say, disproportionately small, being only 25,651, or, on an average, about 119 each. It appears further, from returns obtained by the Society for the Diffusion of Useful Knowledge, that the majority of persons who have availed themselves of these institutions are *not* of the class of mechanics, being made up in the proportion of at least six tenths of master tradesmen, shopkeepers, clerks, &c. In point of fact, therefore, most of these *Mechanics'* Institutions are so in name only; and it would

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be wrong to consider them as at all representing either the desire for scientific knowledge which exists amongst the working classes of Great Britain, or the extent to which it is actually cultivated by them. That they have failed in so great a degree to accomplish the object they had in view is owing, we apprehend, chiefly to two causes: firstly, to the information supplied at them being but too generally of a character ill adapted to the intellectual wants of the working classes: and, secondly, to the working classes not having their natural and proper share in the management of them. To insure a constant supply of the sort of information which mechanics are most in need of, and to induce the general body of mechanics to take to these institutions *as their own* peculiar fountains of knowledge, they should have been allowed, like other people, to *manage their own*; and had they been so, we think it probable they would have been ten times more successful.

PREMIUMS FOR IMPROVEMENTS IN CARPENTRY.

In the year 1837, Mrs. Hannah Acton of Euston Square made a gift to the Society of Arts of the sum of 500*l.*, for the purpose of enabling the society to offer an annual premium for the promotion of practical carpentry, in any of its various applications to civil, naval, and military architecture. In compliance with the terms of this donation, the society give every year a gold medallion for the best design in carpentry of a previously specified description. The premium for 1842, the competition for which closes on the third Tuesday in January, 1842, is for the best design for the hull timbers of a steam vessel of 1000 tons burden. For 1843, the gold medallion is to be bestowed on "the best design for a wooden bridge, having reference to strength, durability, economy, and beauty;" and competitors for this premium must send in their models or drawings to the society on or before the third Tuesday in January, 1843. If drawings are sent in, they must consist of a plan and section, at least, with any other explanatory drawings which the competitor may think proper to furnish.

PREMIUMS TO METAL AND GLASS WORKERS, CHEMICAL MANUFACTURERS, &c.

The following premiums are offered by the Society of Arts for the year 1842. Full descriptions, with certificates of use, and samples where practicable, must be sent to the secretary of the society on or before the first Tuesday of February, 1843.

The Gold Medal. — For any improvement in the manufacture of bar iron.

The Gold Medal. — For any improvement in the manufacture of either copper, zinc, or brass, so as to render them equal in quality to the same imported from abroad.

The Gold Isis Medal. — For the best set of experiments on any metallic alloy that can be usefully applied to the arts. The ingredients of the alloy to be two or more metals in a state of purity. The properties of the alloy particularly requiring notice are the fusibility, the liability to tarnish when exposed to damp air, or to be acted on by ordinary fluids, the tenacity, the cohesive force, the compactness, or porosity, the colour, and the degree of polish of which it is susceptible.

The Gold Medal. — For flint glass free from veins, as dense and transparent as the best now in use, and quite fit for the purpose of opticians.

The Gold Medal. — For any material improvement in the manufacture of crown glass.

The Gold Isis Medal. — For a method of manufacturing a black from which printers' ink may be made, equal to any hitherto known, and fit for the finest kind of copperplate printing.

The Gold Isis Medal. — For the best set of experiments on the various substances from which durable black can be made, suitable for painting in oil or water-colours, or for printers' ink.

Gold or silver medals, or pecuniary rewards, varying from 5*l.* to 50*l.*, for improvements of any description in building steam-engines, steam-boats, steam-carriages, roads, railroads, bridges, tunnels, canals, docks, and harbours; optical, mathematical, astronomical, and nautical instruments; tools used in any of the handicraft trades; as also for any plans or methods tending to the diminution of the danger attending the use of steam-boilers, gunpowder-mills, stage-coaches, and the operations of boring, blasting, and working mines and quarries.

ABOLITION OF THE CLIMBING BOY SYSTEM.

By the Act 3 & 4 Victoria, *for the regulation of chimney sweepers and chimneys*, which came into force on the 1st July, 1841, the use of climbing boys is henceforth virtually prohibited. The Act provides that from the passing of the Act no child under the age of sixteen shall be apprenticed to a chimney sweeper, and enables a child apprenticed between July 1, 1841, and July 1, 1842, to obtain its discharge on application to a magistrate. It also terminates all existing apprenticeships on the day last named. The Act contains some other important regulations, and should be carefully consulted by all persons concerned in house building.

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STATEMENT of the POPULATION, in Counties, of GREAT BRITAIN, and the ISLANDS in the BRITISH SEAS, according to the Census of June, 1841; and the COMPARATIVE POPULATION of 1801, 1811, 1821, and 1831, together with the Houses inhabited and uninhabited at the late Census.

ENGLAND.

Countries.	1801.	1811.	1821.	1831.	1841.	Houses inhabited.	Houses uninhabited.
Bedford	63,393	70,213	83,716	95,483	107,937	21,235	521
Berks	109,215	118,277	131,977	145,389	160,226	31,472	1,566
Buckingham ..	107,444	117,650	134,068	146,529	155,989	31,071	1,157
Cambridge	89,346	101,109	121,909	143,955	164,709	33,112	1,218
Chester	191,751	227,031	270,098	334,391	395,300	73,390	5,845
Cornwall	188,269	216,667	257,447	300,938	341,269	65,641	4,956
Cumberland...	117,230	133,744	156,124	169,681	177,912	34,444	2,369
Derby.....	161,142	185,487	213,333	237,170	272,202	52,910	2,484
Devon	343,001	383,308	439,040	494,478	533,731	94,637	6,117
Dorset	115,319	124,693	144,499	159,252	174,743	34,359	2,012
Durham	160,361	177,625	207,673	253,910	324,277	57,450	3,272
Essex	226,437	252,473	289,424	317,507	344,995	67,602	2,482
Gloucester	250,809	285,514	335,843	387,019	431,307	80,856	5,790
Hereford	89,191	94,073	105,243	111,211	114,438	23,461	1,428
Hertford	97,577	111,654	129,714	143,341	157,237	30,155	1,305
Huntingdon ...	37,568	42,208	48,771	53,192	58,609	11,897	573
Kent	307,624	373,095	426,016	479,155	548,161	95,547	5,013
Lancaster	672,731	828,809	1,052,859	1,336,854	1,667,064	289,166	23,604
Leicester	130,081	150,419	174,571	197,003	215,855	44,649	3,260
Lincoln	208,557	237,891	283,058	317,465	362,717	73,038	2,250
Middlesex.....	818,129	953,276	1,144,531	1,358,330	1,576,616	207,670	9,850
Monmouth	45,582	62,127	71,833	98,170	134,349	24,880	1,417
Norfolk	273,371	291,999	344,568	390,054	412,651	85,922	3,711
Northampton.	131,757	141,553	162,483	179,336	199,061	40,903	1,674
Northumberland	157,101	172,161	198,965	222,912	250,268	48,704	3,031
Nottingham ...	140,350	162,900	186,873	225,327	249,773	50,541	2,749
Oxford	109,620	119,191	136,971	152,156	161,573	32,141	1,440
Rutland	16,356	16,380	18,487	19,385	21,340	4,297	120
Salop	167,639	194,298	206,153	222,928	239,014	47,203	2,093
Somerset	273,750	303,180	335,514	404,200	436,002	81,618	4,702
Southampton .	219,656	245,080	283,298	314,289	354,940	66,589	3,274
Stafford	239,153	295,153	345,895	410,512	510,506	97,676	5,455
Suffolk	210,431	234,211	270,542	296,317	315,129	64,081	2,317
Surrey	269,043	323,851	398,658	486,334	582,615	95,375	3,948
Sussex	159,311	190,083	233,019	272,340	299,770	54,066	3,647
Warwick	208,190	228,735	274,392	336,610	402,121	81,445	6,899
Westmorland.	41,617	45,922	51,359	55,041	56,459	10,848	870
Wilts	185,107	196,828	222,157	240,156	260,007	50,986	2,149
Worcester.....	139,333	160,546	184,424	211,365	253,494	46,962	2,922
York (East Riding)	110,992	134,437	154,010	168,891	193,676	38,200	1,675
City of York and Ainstey	24,393	27,304	30,451	35,862	38,322	7,710	269
York (North Riding)	158,225	169,391	187,452	190,750	204,662	42,509	2,652
York (West Riding)	565,282	655,042	801,274	976,350	1,154,924	226,473	18,870
ENGLAND	8,331,434	9,538,827	11,261,437	13,091,005	14,995,508	2,753,295	162,756

*** The official returns of the CENSUS of IRELAND are not yet complete; but the total population may be taken at about 8,200,000.

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WALES.

Counties.	1801.	1811.	1821.	1831.	1841.	Houses inhabited.	Houses uninhabited.
Anglesey.....	33,806	37,045	45,063	48,325	50,890	11,488	746
Brecon.....	31,633	37,755	43,603	47,763	53,295	10,634	833
Cardigan.....	42,956	50,260	57,784	64,780	68,580	15,102	811
Carmarthen.....	67,317	77,217	90,239	100,740	106,482	23,485	1,383
Carnarvon.....	41,521	49,336	57,958	66,448	81,068	16,869	771
Denbigh.....	60,552	64,240	76,511	83,629	89,291	18,485	991
Flint.....	39,632	46,518	53,784	60,012	66,547	13,320	446
Glamorgan.....	71,525	85,067	101,737	126,612	173,462	33,205	1,466
Merioneth.....	27,506	30,924	34,382	35,315	39,258	8,467	547
Montgomery..	47,978	51,931	59,899	66,482	69,230	13,650	884
Pembroke.....	56,280	60,615	74,009	81,425	88,262	18,804	1,021
Radnor.....	19,050	20,900	22,459	24,651	25,186	4,687	254
WALES.....	541,546	611,788	717,438	806,182	911,321	188,196	10,133

SCOTLAND.

Counties.	1801.	1811.	1821.	1831.	1841.	Houses inhabited.	Houses uninhabited.
Aberdeen.....	123,082	135,675	155,387	177,657	192,283	39,196	1,095
Argyll.....	71,859	85,585	97,316	100,973	97,140	18,514	917
Ayr.....	84,306	103,054	127,299	145,055	164,522	30,247	1,597
Banff.....	35,807	36,668	43,561	48,604	50,076	11,228	478
Berwick.....	30,621	30,779	33,385	34,048	34,427	7,305	382
Bute.....	11,791	12,033	13,797	14,151	15,695	3,067	93
Caithness.....	22,609	23,419	30,238	34,529	36,197	6,962	214
Clackmannan.	10,858	12,010	13,263	14,729	19,116	3,593	110
Dumbarton....	20,710	24,189	27,317	33,211	44,295	7,986	372
Dumfries.....	54,597	62,960	70,878	73,770	79,825	14,375	724
Edinburgh.....	122,954	148,607	191,514	219,745	225,623	38,903	2,861
Elgin.....	26,705	28,108	31,162	34,231	34,994	8,133	370
Fife.....	93,743	101,272	114,556	128,839	140,310	28,965	1,562
Forfar.....	99,127	107,264	113,430	139,606	170,380	36,153	2,036
Haddington....	29,986	31,164	35,127	36,145	35,781	8,009	739
Inverness.....	74,392	78,336	90,157	94,797	97,615	19,182	578
Kinkardine....	26,349	27,439	29,118	31,431	33,052	7,274	314
Kinross.....	6,725	7,245	7,762	9,072	8,763	1,806	114
Kirkcudbright	29,211	33,684	38,903	40,590	41,099	8,159	316
Lanark.....	146,699	191,752	244,387	316,819	427,113	80,531	3,964
Linlithgow....	17,844	19,451	22,685	23,291	26,848	5,309	327
Nairn.....	8,957	8,251	9,006	9,354	9,925	2,296	109
Orkney and Shetland....	46,824	46,153	53,124	58,239	60,607	11,426	267
Peebles.....	8,735	9,935	10,046	10,578	10,520	2,119	154
Perth.....	126,366	135,093	139,050	142,894	138,154	29,172	1,798
Renfrew.....	78,056	92,596	112,175	133,443	154,755	24,626	1,092
Ross and Cromarty	55,543	60,853	68,828	74,820	78,058	16,166	885
Roxburgh.....	33,682	37,230	40,892	43,663	46,062	8,674	365
Selkirk.....	5,070	5,899	6,657	6,853	7,989	1,446	76
Stirling.....	50,825	58,174	65,376	72,621	82,179	15,837	795
Sutherland....	23,117	23,629	23,840	25,518	24,666	4,972	167
Wigtown.....	22,918	26,891	33,240	26,258	44,068	8,512	296
Barracks.....					1,425	17	
SCOTLAND...	1,599,068	1,805,688	2,093,456	2,365,114	2,628,957	505,357	24,307

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SUMMARY OF THE POPULATION TABLES OF GREAT BRITAIN AND CHANNEL ISLANDS.

	1801.	1811.	1821.	1831.	1841.	Males.	Females.
England	8,331,434	9,538,827	11,261,437	13,091,065	14,995,508	7,321,875	7,673,633
Wales	541,546	611,788	717,438	806,182	911,321	447,533	463,788
England & Wales	8,872,980	10,150,615	11,978,875	13,897,187	15,906,829	7,769,408	8,137,421
Scotland	1,599,068	1,813,688	2,093,456	2,365,114	2,628,957	1,246,427	1,382,530
GREAT BRITAIN	10,472,048	11,964,303	14,072,331	16,262,301	18,535,786	9,015,835	9,519,951
Islands in the British Seas	.....	.....	89,508	103,710	124,079	57,598	63,481
TOTAL...	.....	.....	14,161,839	16,366,011	18,659,865	9,073,433	9,586,432

This Summary includes only such part of the Army, Navy, and Merchant Seamen as were on shore within the Kingdom; and excludes travellers by canals and railroads, who are estimated to amount to 4896.

POPULATION OF THE UNITED STATES.

The following is the result of the latest Census taken of the United States of America:—

Free White	Males 7,249,266	14,189,108	
	Females 6,939,842		
Free Coloured	Males 186,467	386,245	
	Females 199,778		
Slaves	Males 1,246,402	2,487,213	
	Females 1,240,805		
		17,062,566	
Persons on board Vessels of War		6,100	
Total		17,068,666	

It will be noticed, as an interesting fact, that in a population of nearly the same amount,—namely, between 14,000,000 and 15,000,000, the females in England exceed the males by about 350,000; while, of the white population of the United States of America, the males exceed the females by about 300,000.

TABLE OF THE COMPARATIVE ILLUMINATING POWER AND ANNUAL COST OF GAS, CANDLES, AND SPERMACETI OIL.

Description of Burners.	Gas Light. Height of Flame.	Gas Light. Consumption per Hour.	Equal to Tallow or Wax Candles, 6 to the lb.	Equal to Argand Oil Lamps.	Consumption for One Year, from Sunset till eleven o'clock. Gas.	Tallow Candles.	Wax Candles.	Sperm Oil.	Annual Expense of Light from Sunset till eleven o'clock. Gas at 9s. per 1000.	Tallow Candles at 8d. per lb.	Wax Candles at 2s. 6d. per lb.	Sperm Oil at 9s. per Gallon.
	In.	Feet.	No.	No.	Feet.	Lbs	Lbs.	Gall.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Single jet	2	$\frac{1}{10}$	1	...	920	46	29	...	0 8 3½	1 6 8	3 12 6	
Ditto.....	4	$\frac{2}{10}$	2	...	1,640	83	58	...	0 14 9	2 13 4	7 5 0	
Two jets, flames conjoining.....	5	2	4	1	3,650	160	116	17½	1 12 10	5 6 8	14 0 0	7 17 6
Three jets.....	4	3	4	1	5,480	160	116	17½	2 9 4	5 6 8	14 10 0	7 17 6
12-hole Argand	3	3½	5	1⅛	5,940	200	145	30½	2 13 5½	6 13 4	18 2 6	13 14 6
Ditto.....	3½	3⅝	7	1¾	6,400	280	203	31½	2 17 7	9 6 8	25 5 6	14 3 6
15-hole Argand	3	5	12	2⅜	9,130	480	348	35	4 2 2	16 0 0	43 10 0	15 15 0

Peckstone's Practical Treatise on Gas Lighting, edit. 1841.

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TABLE

Showing the Rise and Progress of Steam Navigation in Great Britain and Ireland, and the British Plantations, from 1788 to 1838.

Years.	England.		Scotland.		Ireland.		Total in United Kingdom.		British Plantations.		Total built in the British Empire.	
	Vessels.	Tonnage.	Vessels.	Tonnage.	Vessels.	Tonnage.	Vessels.	Tonnage.	Vessels.	Tonnage.	Vessels.	Tonnage.
1788	—	—	1	4	—	—	1	4	—	—	1	4
1789	—	—	1	30	—	—	1	30	—	—	1	30
1795	—	—	1	—	—	—	1	—	—	—	1	
1801	—	—	1	80	—	—	1	80	—	—	1	80
1812	—	—	2	65	—	—	2	65	—	—	2	65
1813	3	168	4	253	—	—	7	361	—	—	7	361
1814	—	—	5	285	—	—	5	285	1	387	6	672
1815	2	161	7	625	—	—	9	786	1	608	10	1,394
1816	4	298	4	270	—	—	8	568	1	670	9	1,238
1817	4	227	3	194	—	—	7	421	3	1,633	9	2,054
1818	3	1,124	3	216	—	—	6	1,340	3	1,198	9	2,538
1819	2	175	2	167	—	—	4	342	—	—	4	342
1820	3	102	4	403	1	150	8	655	1	116	9	771
1821	12	1,403	10	1,545	—	—	22	3,008	1	258	23	3,266
1822	23	2,080	4	369	—	—	27	2,449	1	185	28	2,634
1823	17	2,344	2	125	—	—	19	2,469	1	52	20	2,521
1824	12	1,687	5	547	—	—	17	2,234	—	—	17	2,234
1825	19	2,600	5	403	—	—	24	3,003	5	1,189	29	4,192
1826	50	5,920	22	2,718	—	—	72	8,638	4	404	76	9,042
1827	18	2,264	9	994	1	118	28	3,376	2	408	30	3,784
1828	23	1,687	5	352	—	—	30	2,039	1	246	31	2,285
1829	13	1,080	3	671	—	—	16	1,751	—	—	16	1,751
1830	10	931	8	814	—	—	18	1,745	1	481	19	2,226
1831	24	2,054	7	695	—	—	31	2,749	5	1,687	36	4,436
1832	19	943	14	1,908	—	—	33	2,851	5	1,239	38	4,090
1833	27	1,964	6	964	—	—	33	2,928	3	1,017	36	3,945
1834	26	3,433	10	1,655	—	—	36	5,148	3	628	39	5,776
1835	63	6,844	23	4,080	—	—	86	10,924	2	357	88	11,281
1836	43	5,924	20	2,854	—	—	63	8,778	6	942	69	9,720
1837	53	6,223	22	4,488	3	958	78	11,669	4	478	82	12,147
1838	66	6,286	18	3,263	—	—	84	9,549	3	288	87	9,837
Total at each place	541	57,942	231	31,037	5	1226	777	90,205	57	14,471	834	104,676

No steamers have been built at the islands of Jersey, Guernsey, and Man. The tonnage is exclusive of the space occupied by the engines.

TABLE

Showing the Rise and Progress of the Steam Royal Navy of Great Britain.

	Number.	Horses power.		Number.	Horses power.
In the year 1828	4	400	In the year 1835	21	2,928
1829	7	692	1836	23	3,168
1830	8	792	1837	24	3,308
1831	11	1,212	1838	55	6,622
1832	14	1,652	1839	61	7,091
1833	19	2,552	1840	76	10,661
1834	20	2,792	1841	102	

The preceding list includes several vessels employed in the Post Office service.

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COMPARATIVE STATEMENT of the Number, Tonnage, and Power of Steam Vessels, in 1836, i all Parts of the Globe where British Consuls, Ministers, or Agents are accredited.

Places.	No. of Vessels.	Tonnage.	Horse power	No. of Engines built in England and Scotland.	No. of Sea-going Steamers included in the preceding.	Power of Sea-going Steamers. From 100 to 150 Horse-power.	From 150 to 200 Horse-power.	From 200 to 300 Horse-power.	From 300 to 400 Horse-power.	From 400 to 500 Horse power
France	67	6,621	2,991	46	13	4				
Holland	30	5,497	2,614	4	6	3	2			
Russia	23	unknown	2,075	unknown	8	5	1	1		
Barbary States	10	—	1,550	2	10	2	8			
Sweden	27	1,200	1,244	1	5					
Sicily	8	2,061	805	8	8	2	2			
Turkey	2	1,088	320	2	2	1			1	
Austria	6	665	442	5	5	2				
Portugal	4	790	380	unknown	3	1	1			
Tuscany	3	869	335	3	3	2				
Sardinia	5	979	315	5	5	1				
Denmark	5	625	311	4	5					
Belgium	3	unknown	224	3	1			1		
Prussia	3	502	200	2	3					
Hamburgh	3	273	192	3	2					
Spain	4	626	150	4	2					
Mexico	2	285	100							
Hanse Towns	2	49	68	2	2					
Brazil	3	270	48	3	1					
Mecklenburgh	1	82	40	1						
Total in 1836	211	22,482	14,604	98	84	23	14	2	1	
United States in 1838	800	160,000	57,019		14	5	2			
Total combined Steam Marine of the Globe, exclusive of the British Empire	1011	182,482	71,623	98	98	28	16	2	1	

TABLE OF THE COMPARATIVE VALUE OF DIFFERENT SORTS OF COALS FOR STEAM ENGINE PURPOSES.

The price of Newcastle coals evaporating 7·68 of water per lb. of coals was, in 1840, 14*s.* 6*d.* per ton in the Pool; this price is taken as a standard, and the value given is according to the evaporative power of the different varieties.

	Description of Coals.	Water evaporated per lb. of Coal.	Value per Ton in the Pool.
1	The best Welsh	9·493	17*s.* 11*d.*
2	Anthracite	9·014	17 0
3	The best small Newcastle	8·524	16 1
4	Average small Newcastle	8·074	15 2¾
5	Average Welsh	8·045	15 2¾
6	Coke from gas works	7·908	14 11
7	Coke and Newcastle small, half and half	7·897	14 10¾
8	Welsh and Newcastle, mixed, half and half	7·865	14 10
9	Derbyshire and small Newcastle, half and half	7·710	14 6¼
10	Average large Newcastle	7·658	14 5½
11	Derbyshire	6·772	12 9¾
12	Blythe Main, Northumberland	6·600	12 5½

Wicksteed's Experimental Inquiry, 1841.

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NEW PATENTS

GRANTED BETWEEN OCTOBER 1. 1840, AND SEPTEMBER 23. 1841.

E. *denotes that the Patent is for England,* S. *that it is for Scotland, and* I. *for Ireland.*

Acid, carbonic: — Sewell, T. R., Dec. 31. E.
Acid, sulphuric: — Hills, F. and G., April 15. E. — Farmer, T., Oct. 14. S.
Air engines: — Stirling, J. & R., Oct. 1. E. — Newton, W., Oct. 15. E. — Beale, B., July 13. E.
Air vessels: — Furnival, J. B., Jan. 21. E.
Ammonia, carbonate of: — Laming, R., March 15. E.; June 14. S.
Axletrees: — Bergue, C. de, Aug. 21. E.
Bagatelle boards: — Hagen, T., July 7. E.
Bands, fastening for: — M'Envoy, H., April 5. E.
Baths: — Poole, M., July 13. E.
Bell pulls: — Joyce, T., Oct. 1. E.
Belts, &c.: — Whitehead, J. H., Nov. 2. E.; Nov. 6. S.
Blocks, wooden, for ships: — Brewer, H. N., March 5. E.; April 7. S.
Boilers, steam: — Williams, C. W., Nov. 17. E. — Davis, J., Dec. 16. E. — Waddington, N., Jan. 26. E.; Aug. 25. S. — Whitehouse, J., May 25. E. — Von Rathen, A. B., July 28. E. — Hawthorn, R. and W., Nov. 19. S. — Moindron, P. M., Dec. 17. S. — Hills, F., Nov. 1.
Bookbinding: — Whitaker, R., Sept. 4. E.
Bolts, &c.: — Coates, E. J., Jan. 30. E.; April 28. S. — Ryder, W., Feb. 8. E.; June 23. S.
Braids: — Bedell, C., Nichels, C., and Turner, A., Jan. 19. E.
Brewing: — Beilby, J., April 5. E. — Tizard, W. L., April 5. E.
Bricks: — Child, G., Jan. 4. E. — Cook, R., and Cunningham, A., March 22. E. — Gibbs, J. April 29. E. — M'Nab, A., May 11. E.; May 26. S. — Ainslie, J., May 22. E.
Brushes: — Thompson, W., Jan. 8. E. — Grant, J. C., Sept. 8. E.
Buckle, an improved: — Maurel, S. M. A., Sept. 20. E.
Building and working under water: — Bush, W., Sept. 21. E.
Buttons: — Parkes, J., Dec. 31. E. — Jacquin, C. A., Jan. 26. E. — Harris, T., April 22. E. — Jefferies, H., April 22. E. — Chambers, T., Aug. 27. E.
Buffing apparatus: — Taylor, W. W., Feb. 1. E.
Calomel: — Thompson, A. T., March 8. E.
Candles: — Gwynne, G., Nov. 5. E.; Dec. 1. — Molyneux, F., Dec. 9. S.
Candlesticks: — Stevens, J. L., and King, J., June 25. E.
Candlesticks, fastening candles in: — Ash, G. C., June 12. E.
Candle wicks: — Card, N., Sept. 8. E.
Cards, sharpening teeth of: — Hulme, J., Sept. 20. E.
Carpets: — Graham, H., Decem. 16. E.; May 6. E.; April 21. S. — Henshall, E., Jan. 26. E.; May 24. S. — Nickels, C., June 28. E.; June 1. S.
Carriages: — Varley, J., March 8. E. — Gaurey, J., March 31. E. — Fuller, T., July 7. E. — Shillibeer, G., Sept. 20. E. — Buchanan, J., Nov. 25. S.
Casks, metallic: — Brown, S., Aug. 11. E. Dec. 31., S.
Castors: — Leach J., Jan. 14. E. — Passe, H., Feb. 1. E.
Cement: — Kerr, T., Dec. 1.
Chimneys, improvements in: — Day, G. T., June 23. E. — Phillips, W. H., and Hichinbotham, D., July 13. E.
Chimneys for lamps: — Deacon, J., Nov. 19. E.
China, manufacture of: — Trewhitt, H., Dec. 24. S.
China printing: — Palmer, E., June 12. E.
Chlorine: — Lee, J., Aug. 4. E.; Aug. 3. S.
Clocks: — Barwise, J., and Bain, A., Jan. 11. E.
Cloth cutting: — Steiner, F., Mar. 1.
Cloth manufacturing: — Bryant, Z., April 3. E.
Cloth stretching: — Poole, M., March 22. E.
Cloth, umbrella and parasol: — Mac Lellan, J., Jan. 30. E.; Feb. 9. S.
Coffeepot: — Andrews, W. W., July 21. E.
Coke: — Wells, J., Dec. 30. E.
Coke ovens: — Cox, J., Nov. 21. E. — Clark, G. D., Oct. 5. S.
Corks, &c.: — Brockedon, W., June 9. S.
Cork cutting: — Harvig, J., and Moreau, F., Aug. 21. E. — Lachenal, L., Sept. 4. E.; Sept. 7. S.
Corrosive sublimate: — Thompson, A. T., March 8. E.
Cotton, &c. carding: — Horsfall, W., Oct. 1. E. — Jones, J., Dec. 23. E. — Fontainemoreau, A. P. A. L. C. de, Jan. 14. E. — Westley, W. H., Jan. 14. E.; March 6. S. — Hulme, J., Sept. 20. E. — Leach, E., Dec. 28. S.
Cotton, &c. drawing: — Whitaker, J. B., Dec. 31. E. — Fairbairn, P., and Sertell, W., Jan. 26. E.
Cotton dressing: — M'Bride, J., July 21. E.
Cotton, &c. picking: — Newton, W., March 15. E.
Cutting vegetables, &c.: — Ducie, Earl of, Clyburn, R., and Budding, E., Oct. 15. E.; Jan. 8. S. — Townshend, G., April 29. E. — Phillips, C., May 20. E. — May, C., Feb. 12. S.
Damp, prevention of: — Forster, W. E., Sept. 20. E.

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Dibbling: — Bradshaw, P., Nov. 19. S. Jan. I.
Dish covers: — Griffiths, T., Feb. 8 E. — Morley, P. A., May 6. E.
Distillation: — Todd, G. M., Jan. 14. E.
Drags: — Wright, J., March 22. E.
Drawing scales: — Drake, J. C., Feb. 18. E.
Dressing yarns: — Heaton, J., Nov. 12. E.
Drilling: — Edmunds, R., Oct. 22. E. — Bradshaw, P., Nov. 19. S.; Jan. I.
Drying and damping: — Unsworth, H., Jan. 7. S.
Earthenware, manufacture of: — Trewhitt, H., Dec. 24. S.
Eggs, hatching: — Bucknell, W., March 22. E.
Electric deposition, production of works by: — Parkes, Alex., March 29. E.
Electricity, application of to motive purposes: — Pinkus, H., May 14. E. — Wheatstone, C., July 7. E. — Molyns, F. de, Aug. 21. E.
Engraving, electric: — Spencer, T,. and Wilson J., Oct. 7. E.; Jan. 8. S. — Pinkus, H., Oct. 15. E. — Walker, A. E. Dec. I.
Engraving, line: — Lekeux, J. H., June 23. E.
Engravings, wood: — Wood, H. W., Nov. 25. E.
Evaporation: — Edwards, H. H., Nov. 5. E.; Nov. 11. S. — Adcock, H., Dec. 30. E. — Furnival, J. B., Jan. 26. E.
Fabric, an improved: — Henson, W., Nov. 19. E.; Jan. 4. S.
Fabrics, looped: — Mee, J., June 5. E.
Fabrics, netted: — Oram, J., March 31. E. — Thorburn, J., Sept. 8. E. — Vouillion, F., Oct. I.
Feathers, dressing: — Lawes, T., Nov. 10. E.; May 10. S.; Dec. I.
Felting: — Poole, M., May 6. E.; May 24. S.
Felted cloth: — Newton, W., Sept. 20. E.
Filters: — Schroeder, H., Nov. 2. E.
Filtrations: — Clark, Thos., March 8. E. — Chesterman, W., June 23. E.
Fire arms: — Shaw, J., Nov. 17. E. — Heurteloup, Baron, Sept. 9. E.
Fire escapes: — Simpson, A. H., Nov. 5. E. — Journet, P., May 19. E. — Winterborn, J., May 22. E.
Fire grates: — Rathen, A. B. von, Feb. 22. E. — Beart, R., Oct. 14. S.
Fireproof safes: — Milner, T., Nov. I.
Flax drawing: — Fairbairn, P., and Suttell W., April 28. S.
Flax dressing: — Molyneux, J., Dec. 16. E.; Nov. 26. S.; March. I.
Flour mills: — Scott, G., Sept. 23. E.
Flues: — Apsey, J., April 6. E.
Fluids, measuring: — Barker, J. April 20. E.
Fluids, regulating flow of: — Sovitus, A. E. J., March 22. E.
Framework knitting: — Reynolds, O. L., Nov 25. E. — Cartwright, J., Warner, H., and Haywood, J., Feb. 4. E.; Dec. 22. S. — Rand, J., March 6. E. — Johnson, J., Feb. 15. S.; April. I.
Friction gloves: — Hancock, W. jun., Feb. 3. E.; March 19. S.
Fuel, combustion of: — Hall, S., Jan. 14. E.; Feb. I. S. — Foard, E., Jan. 16. E.; July 28. S.
Fuel, manufacture of: — Albert, D. F., Feb. I. E. — Newton, W. E., July 7. E. — Oram, T., Dec. I.
Furnaces: — Kurtz, A., Nov. 5. E.; June 25. S. — Williams, C. W., Nov. 17. E. — Smith, J., Nov. 25. E. — Hannah, J. L., Nov. 25. E. — Waddington, N., Jan. 26. E.; Aug. 25. S. — Schafhæutr, C., Manby, E. O., and Manby, J., Jan. 30. E. — Young, T., Feb. 3. E. — Rathen, A. B. von, Feb. 22. E.; July 8. S. — Coupland, M., Sept. 4. E. — Heindrychx, F., April 24. E. — Welch, J. W., July 21. E. — Jukes, J., Sept. 6. E. — Moindron, P. N., Dec. 17. S.
Gas burners: — Dockree, J., March 15. E.
Gas, manufacture of: — Grafton, J., Sept. 4. E. — Hebert L., Sept. 8. E.
Gas meters: — Botton, C., Dec. 16. E. — Barker, J., Dec. 23. E. — Noone, G. E., Feb. 18. E. — Peckston, T., and Le Capelain, P., July 15. E. — Defries, N., Nov. 11. S.; June. I.
Gas, supplying: — Lowe, G., March 16. E. Smith, S., Nov. 26. S.
Gas, purifying: — Phillippi, F. T., July 21. E.
Gelatine: — Webster. W. H. B., Nov. 25. E.; Dec. 31. S.; Dec. I. — Dean, J., Feb. 23. E.
Glass, manufacture of: — Bessemer, H., and Schönberg, C. L., Sept. 23. E.
Gloves: — Newton, E., and Archbold, J., May 4. E.
Gloves, friction, Hancock, W., jun., Feb. 3. E.; March 19. S.
Governors, steam-engine: — Hick, B., jun., Nov. 3. S. — Hannerick, P., March 3. S.
Gunpowder, cases for: — Hale, W., and Dell, E., Aug. 13. E.
Harps: — Hawley, J., Dec. 9. S.; Oct. I.
Hat bodies: — Wakefield, J., and Ashton, J., Nov. 21. E.
Hearses: — Shillibeer, G., Sept. 20. E.
Heat, applying: — Poole, M., June 26. E.; June 22. S.
Heating: — Perkins, A. M., Jan. 21. E.; May 12. S. — March, J. C., June 8. E. — Poole, M., June 26. E.; June 22. S.
Hinges: — Ratcliffe, J., Aug. 4. E. — Wilks, S., Nov. 17. S. — Horne, T., Nov. 17. S.
Hooks and eyes: — Pumphrey, J., Nov. 2. E.
Hops, essence of, called "Hummuline:" — Newton, W. E., Feb. 15. E.
Horse brushes, &c.: — Hancock, W., jun., Feb. 3. E.
Horse collars: — Day, J. R., Jan. 6. E.
Horse rakes and hoes: — Grant, J. C., Sept. 8. E.
Horse-shoes: — Harris, T., Jan. 11. E. — Vaux, T., Jan. 19. E.
Hydraulic apparatus: — Walker, J., March 8. E.

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Ice, artificial : — Kirk, H., Nov. 5. E.
Ink : — Scott, H., Dec. 31. E.
Inkstands : — Gall, W., May 22. E. — Ganei, J., and Bain, A., June 21. E.
Iron, case-hardening : — Roberts, R., Nov. 25. E.
Iron, manufacture of : — Booker, T. W., Feb. 22. E. ; March 16. S. — Powell, L., and Ellis, R., April 24. E. ; May 5. S. — Gregory J., and Green, W., May 14. E
Iron, protecting from corrosion : — Mallet, R., July 7.—Morewood, E., Aug. 27.
Iron, sulphates of : — Gregson, J. B., Dec. 23. E ; July 29. S.
Keys : — Gerish, F. W., Sept. 2. S.
Knitting fabrics : — Thorburn, J., Feb. 8. E.
Knitting : — Tielens, J. A., June 12. E.
Labels, affixing : — Haughton, J., June 19. E. ; Aug. 11. S.
Lace : — Crofts, W., Nov. 7. E. ; July 28. S. — Deverill, H., May 10. E. — Chater, J., and Gray, R., June 26. E. — Boot, J., and King, J., Sept. 4. E.
Lamps : — Halpin, G. jun., Nov. 7. E. — Mechi, J., Nov. 10. E. — Kempton, W. H., Dec. 31. E. — Young, T., July 9. E. ; June 28. S.
Land, rolling, &c. : — Crosskill, W., Sept. 9. E.
Lead : — Merry, A. T., March 22. E.
Letters, metallic : — Dumont, C., May 22. E. ; May 17. S
Level, an improved : — D'Olszoroski, A. P., Dec. 16. E.
Light : — Gurney, G., March 23. E. — De Charliers, A. D., April 27. E. — Simpson, A. H., Irvin, T. H., and Irvin, T. E., June 17. E.
Likenesses, &c., taking : — Beard, R., July 28. S. ; Nov. 1.
Lime, &c. : — Newton, W. E., April 3. E. May 7. S.
Lithography : — Hullmandel, C. J., Nov. 5. E.
Locks : — Clark, T., Oct. 22 E. ; Jan. 1. S. ; Nov. 1. — Baillie, B., Dec. 23. E. — Tildesley, J., and Sanders, J., March 29. — Hancock, J., May 6. E. — Berry, M., July 14. E. — Gerish, F. W., Sept. 2. S.
Locomotive engines : — Parkin, T. W., and Wylde, E., Nov. 12. E. — Heathie, J., Dec. 16. E — Thornton, G., Dec. 23. E. — Gall, W., Jan. 28. E. — Stephenson, R., June 23. E.—Burnett, J., Feb. 3. E. — Woods, J., May 22. E.
Looms : — Parker, O., Oct. 22. E ; Dec. 24. S. — Berry, Miles, Nov. 27. E ; Feb. 20. S —Newton, W., Dec 31. E ; Sept. 17. S. — Staner, F., Jan. 19. E. ; March 19. S.—Darker, Messrs., and Wood, W., Jan. 21. E. ; Jan. 18. S.—Ogden, J., and Woollam, J. G., April 3. E. — Rostron, J., and Welch, T. ; April 22. — Paley, J., jun., May 10. E. ; May 20. S.—Darker, W. H., sen. and jun., and Wood, W., Sept. 4. E. — Poole, M., Oct. 1.
Lozenges, cutting : — Drew, J., Sept. 6. E.
Lubricating matters : — Holcombe, C. T. May 4. E.
Magnesia, sulphates of : — Gregson, J. B., Dec. 23. E. ; July 29. S.
Mangling woven goods, &c. : — Unsworth, H., Jan. 7. S.
Manure : — Kerr, T., Dec. I.
Mattresses, &c. : — Mikels, C., June 25. E. ; June 1. S.
Measuring, &c. : — M'Kinley, W., Nov. 10. E. : March 31. S.
Mechanical power : — Fitt, J., Oct. 7. E. Woods, J., May 22. E. — Petre, W., June 19. E.
Metals, cutting and shaping : — Whitworth, J., and Spear, J., March 17. E.
Metals, plating : — Elkington, G. R. and H., June 22. S.
Metals, precipitation and decomposition of : — Barratt, O. W., Sept. 8. E.
Metals, preventing corrosion of : — Wall, A., Nov. 5. S. ; Dec. 1.
Meter, time and distance : — Johnston, J., Nov. 1.
Mills, flour : — Scott, G., Sept. 23. E. — Dean, A., and Evans, E., Dec. 8. S.
Mosaic work from wood : — Von Almonde, O. C., Nov. 12. E.
Motive powers : — Talbot, W. H. F., Oct. 1. E. — Golightly, C., Jan. 4. E.—Johnston, J., Feb. 8. E. — Petrie, W., April 27. E. ; May 24. S. — Berry, M., June 25. E.—Berry, M., Aug. 27. E. — Stoltenoyer, C. F., Sept. 17. E — Rudge, E., Nov. 2. S. — Gilbert, G. A., Dec. 1.
Mourning coaches, Snillibeer, G., Sept. 20. E.
Muffs : — Richie, G., and Bowrie, E., Oct. 1. E.
Musical instruments : — Mannoury, P. M., Nov. 5. E.
Nails, &c. : — Coates, E. J., Jan. 30. E. — Berry, Miles, May 4. E.
Oil cake : — Hutchinson, W. E.
Oil, producing : — Holoeck, E., Dec. 31. E. — Wilhelme, Count of, Sept. 4. E.
Oils, purifying : — Clark, G. D., Nov. 5. E. — Walther, D., Dec. 23. E. ; May 7. S. — Newton, W., Feb. 22. E. — Wilhelme, Count of, Sept. 4. E.
Ornaments : — Lacy, W., Jan. 11. E.
Paints and pigments : — Annes, J., Jan. 16. E. ; Jan. 1. — Dyer, C. B., March 16. E. — Rand, J., March 16. S. ; June 1. — Rouquette, A. C., Oct. 1.
Paddle-wheels : — Winkles, B., Nov. 19. S. — Field, J., March 22. E. ; June 16. S. — Rapson, J., Nov. 3. E. — Daubney, H. C., Nov. 25. E.
Paper : — Amos, E. E., Nov. 10. E. ; March 18. S. — Barratt, F., Nov. 25. E. —Dickinson, J., Dec. 23. E. ; Feb. 1. S — Murray, W., Feb. 1. S. ; March. 1.—Ransom, R. G., and Melbourn, S ; Nov. 1.
Paper, ruling : — Berry, M., June 5. E.
Papier Machée : — Bellbridge, J., May 27. E.
Passenger register : — Knight, W., June 28. E.
Patten and clog ties : — Stocker, A. S., and Clement, H., April 27. E.
Paving : — Wood, T., Oct. 7. E. — Rankine, B., April 27. E. — Reynolds, O., April 27. E — Calcino, Count de, Sept. 21. E.
Pen-holder : — Bayliss, C. W., Dec. 16. E.

Piano-fortes : — Dodd, E., Nov. 7. E. — Steward, J., Dec. 16. E. — Goodwin J., June 23. E. — Steward, J., July 7. E. — Hawley, J., Dec. 9. S. ; Oct. 1.
Pictures, obtaining : — Talbot, W. H. F., Feb. 8. E.
Picture frames : — Spencer, T., March 8. E. ; Aug. 4. S.
Piles, driving : — Wells, H. A., March 17. E. — Duncan, J., Sept. 21. E.
Pins : — Newton, W., July 28. E. ; Sept. 15. S. — Jenkins, W. W., Aug. 27. E. — Berry, M., Dec. 1.
Pipes : — Emmerson, R. F., Nov. 3. E. — Smedley, T., Oct. 14. S.
Pistons : —Palmer, G. H., and Perkins, C , Nov. 28. E. ; Feb. 16. S.
Plate glass : — Dod, C., Nov. 12. E.
Ploughs : — Henshaw, W., Dec. 1. E. — Smith, T., Feb. 15. E. — Bentall, E. H., June 10. E. — Cooper, R., Dec. 24. S. ; March. I. —Campbell, A. F., and White, C., Dec. I.
Potash, carbonate of : — Clough, W. T., March 17. E.
Potatoes : — Grillet, C., Nov. 25. E.
Pottery : — Kerr, T., Dec. I.
Power, increasing : — Ruthven, M. W., March 22. E. ; June 30. S.
Presses, discharging : — Watson, J., April 28. S.
Presses, hydraulic : — Oram, R., June 12. E.
Preserving animal and vegetable substances : — Gunter, H., Jan. 6. E. — Goldmer, S , March 8. E. — Wertheimer, J., March 8. E. ; Dec. 24. S. ; March. I. — Payne, C., July 9. E. ; Jan. I. — Edwards, D., Nov. I.
Printing : — Clay, J., and Rosenberg, F., Nov. 27. E. ; Jan. I. — Mabley, W. T., Dec. 17. E. — Baggs, J., Jan. 23. E. — Wayte, J. W., June 12. E.
Printing china : — Palmer, E., June 12. E.
Printing cotton, &c. : — Phillipi, F. T., Nov. 25. E. ; Nov. 30. S. — Kempton, W. H., Dec. 30. E. — Lloyd, N., and Rowbotham, H., Jan. 26. E. ; Feb. 9. S. — Ollivant, G. B , and Howard, A., June 5. E — Beard, R., Oct. 7. S. — Lees. J. jun., Dec. 11. S. —Watson, J , April 28. S.
Procedencia and *Prolapsus Uteri*, Relief of : — Elam, A., Sept. 20. E
Propelling : — Galloway, E., Nov. 2. E. ; Nov. 11. S. — Wansburst, H., Nov. 2. E. — Daubney, H. C., Nov. 25. E. — Blaxland, G., Nov. 28. E. ; April 8. S. — Melville, J , Jan. 21. E. — Scott. J., Feb. 8. E. —Whitelaw, J., and W., Feb. 15. E. ; May 10. S. — Napier, D., March 22. E. — Finch, E., March 25. E. — Joest, W., May 26. E. ; May 24. S. — Taylor, W. H., June 5. E. — Gibbs, J., June 5. E. — Bodmer, J. G., June 16. E. — Brown, Sir S., June 19. E. ; June 4 S. — Campbell, J. G. T., June 19. E. — Von Rathen, A. B., July 28. E. — Williams, O., August 4. E. — Jones, T. S., August 4. E. — Pelletan, P., Sept. 6. E. Stoltmeyer, C. F., Sept. 17. E. — Berry, M., Oct. 29. S. — Fourdrinier, G. H., and E. N., March 31. S.
Pumps : — Clarke, J., Nov. 5. E. ; Feb. 9. S — Simpson, A. H., Dec. 9. E. — Dashwood, J. G , Feb. 22. E.
Pyrites, obtaining sulphur, &c. from : — Farmer, T., Oct. 14. S.
Rags, &c., cutting : —Bennett, J., Nov. 9. S.
Railroads : — Petit, R., Oct. 15. E. ; April 12. S. — Birch, E., Nov. 12. E. — Thornton, G., Dec. 23. E. — Scott, J., Feb. 8. E. — Gibbs, J., June 5. E. — Rangeley, J., July 15. S.
Rails : — Onions, G., July 7.
Railway Accidents, Prevention of : — Haughton J., jun., Nov. 24. E. ; April 28. S — Lindo, A. A., Dec. 18. E. — Hancock, W., Jan. 14. E.—Curtis, C. B., Jan. 19. E.
Railway carriages : — Petit R., Oct. 15. E. ; April 12. S. — Boydell, J., jun. Nov. 2. E. — Birch, E., Nov. 12. E. — Pope. F., Nov. 24. E. — Beathie, J., Dec. 16. E. — Thornton, G., Dec. 23. E. —Bessemer, H., Jan. 6. E. ; April 20. S.— Holdsworth, H., Nov. 11 S. — Gall, W., Jan. 28. E. — Bennett, J., Feb. 3. E. — Wright, T., March 22. E. — Kendall, P., April 17. E. — Taylor, E., May 11. E. — Carr, J., jun., May 20. E. — Buchanan, J., Nov. 25. S. — Condie, J., June 22. S. — Hills, F., Nov. I.
Railway chairs, &c. : — Beathie, J., Dec. 16. E. — Ransome, J., and May, C., Feb. 15. E. ; April 28. S.
Railway wheels : — Losh, W., June 26. E. — Phipps, G. H., July 2. E. — Onions, G., July 7. E. — Petit, R., April 12. S.
Raising water : — Hancock, J., Oct. 15. E. — Barnes, R., March 22. E. — Marchell, T., June 28. E. — Smith, A., July 21. E. — Else, R , Sept. 8. E. — Marnering, G., and Harrison, H., Sept. 8. E.
Raising weights : — Grylls. J., Dec. 31. E. ; Dec. 31. S. — Haley, J., Dec. 31. E. ; Jan. 21. S. — Scott, J., Feb. 8. E. — Methley, W. and T. C., June 26. E.
Reaping : — Duncan, J., Nov. 2. E.
Rectifying : —Todd, G. M., Jan. 14. E.
Rivers, clearance of : — Scamp, W., Feb. 16. E ; Sept. 21. S.
Roads : — Gibbs, J., June 5. E. — Whitworth, J., Nov. 16 .S. — Bourne, H., Jan. I
Ropes : — Orange, J. E., Nov. 2. E. —Heinmann, J. B. F. W., March 8. E. —Bennett, J., Nov. 9. S. — Stirling, R., Dec. I.
Rotary engines : — Ruthven, M.W., March 22. E. — Whitelaw, J., and Stirrat, J., Sept. 23 E. — Macrae, C., Dec. 31. S. — Cordes, G. J., and Locke, E , Jan. 28. S. ; April. I.
Rooing and slubbing : — Hardman, S., Aug. 27. E ; Sept. 3. S. —Jones, E., June 12. E. ; Aug. 26. S. — Sliddon, F., April. I.
Rugs, &c. : — Henshall, E., May 24. S. — Nickels, C., June 28. E. ; June 1. S.
Safes, fire-proof : — Milner, T., Nov. I.
Sal ammonia : — Phillippi, F. T., July 21. E. — Waterton, H., Dec. I.

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Wafers, cutting: — Drew, J., Sept. 6. E.
Warming: — Phillips, W. H., and Hichinbotham, D., July 13. E.
Watches, &c.: — Massey, F. J., May 4. E. — Walker, W., June, 23. E.
Water, obtaining fresh from salt: — Morrice, R. E., Jan. I.
Water Closets: — Robson, J. W., Nov. 2. E. — Lindsay, J., March 29. E.—Hulme, G., May 27. E.
Water meter: — M'Nab, A., July 7. E.; June 21. S.
Water wheels: — Winkles, B., Nov. 19. S.
Wearing apparel: — Barsham, W. J., April 5. E.
Weaving: — Davis, J., Oct. 7. E. — De Bergue, C., Nov. 7. E.; Mar. 3. — Kenworthy, W., and Bullough, J., Jan. 14. E.; May 17. S. — Smith, J., Jan. 19. E.; Nov. 19. S. — England, G., March 2. E. — Bentham, J., April 22. E. — M'Bride, J., July 21. E.; June 25. S.
Weighing: — Goodacre, R., March 22. E. — Dampier, C. E., April 15. E.
Whalebone: — Kortright, L., March 17. E.; Sept. 14. S.
Wheat, cleaning: — Newton, W., Jan. 11. E.
Wheat, setting:—Shaw, J. H., June 19. E.
Wheel carriages: — Buchanan, J., Dec. 28. E. — Adams, W. B., Dec. 28. E. — Phillips, W. P., and Peck, W. B., Feb. 15. E.
Wheels: — Riddle, G., and Piper, T., Oct. 22. E. — Heathie, J., Dec. 16. E. — Losh, W., June 26. E. — Phipps, G. H., July 2. E.
White lead: — Wildes, G., Dec. 16. E. — Wildes, G., Sept. 4. E. — Pattinson, H. L., March 3. S.; June. I.
Windlasses: — Anderson, J., April 5. E.
Windows, &c., raising and lowering: — Andrews, W. W., Feb. 2. E.
Wine, manufacture of:—Stone, W., Oct. I.
Wood-cutting: — Burnett, W. H., Sept. 9.; Dec. 28. S.; Jan. — Richards, R., Feb. 26. S.
Wood, preserving: — Uzielli, M., Jan. 11. E.; Mar. 22. S.
Wood, producing uneven surfaces in: — Wood, H. W., Nov. 25. E.
Wool, cleaning: — Hickes, G., Aug. 21. E.; Oct. 29. S. — Newton, W., March 19 E.; June 29. S.
Wool, combing and preparing: — Donisthorpe, G. E., Nov. 7. E. — Pierce, W., Dec. 9. E.; Feb. 24. S. — Fuller, T., Feb. 8. E. — Leach, E., Dec. 28. S.
Wool, drying, &c.: — Robinson, T., Jan. 19. E.; April 30. S. — Robinson, T., April 27. E. — Poole, M., Dec. 31. S.
Wool, picking: — Newton, W., March 19. E.; June 29. S.
Woollen cloths: — Wells, H. A., April 17. E
Wrenches: — Stubs, J., Dec. 31. E.; March 26. S.
Yarns, manufacture of: — Garratt, J., and Mason, J., Sept. 8. E.
Zinc: — Merry, A. T., March 22. E.

PROGRESS OF INVENTION AND DISCOVERY.

Improvements in steam-engines have, during the past, as many preceding years, occupied a prominent place in the Patent Lists. Attention appears to be now chiefly turned to the working of steam *expansively*. *Mr. Urwin*, whose improvements have reference to this system of operation, proposes the following plan:—A receiver is attached to one side of the cylinder, the opening into which is from the cylinder, and a little higher from the bottom than the thickness of the piston. This opening is covered, when necessary, by a slide within the receiver. When the piston has nearly reached the bottom of the cylinder, and consequently has passed the said opening, the steam occupying the upper part of the cylinder rushes into, or, more properly speaking, expands into, the adjoining receiver; a small part of it also passing by a small groove in the cylinder to the under face of the piston, to assist in returning the stroke. As soon as in the upward stroke the piston has again passed the opening into the receiver, the steam in the receiver returns into the lower part of the cylinder by expansion, and, pressing on the under surface of the piston, completes the stroke. The operation is repeated at the next stroke; but, as the receiver is now full of steam of the density of that which occupied the cylinder at the termination of the previous stroke, it follows, that to fill the receiver to the density of the steam used in the down stroke, as much steam only is required as is due to the difference of the densities. Whatever portion of the steam employed in the downward stroke does not find its way into the receiver or to the under side of the piston is condensed as usual. The action of the engine is thus continued by the full pressure of the steam in the downward stroke, and the diminished pressure of the expanded steam in the upward one. The owners of the Hercules steam-tug assert that they save 40 per cent. of fuel by the use of this plan. *Mr. W. S. Henson's* patent is for a plan which, in some measure, combines the advantages of high and low pressure engines, and is particularly applicable where the unequal pressure arising from the employment of great expansion cannot be admitted, or where water for condensation is not plentiful. Mr. H. uses high-pressure steam; and when the piston has nearly reached the end of its stroke, he liberates a valve in the cylinder, which permits the escape of so much steam that the remainder is but little above atmospheric pressure, and that remainder he condenses in the ordinary way. It appears by calculation, that a considerable saving of fuel, as well as of water, will be

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effected by this plan. Sometimes Mr. H. uses the force of the steam which he permits to escape from the cylinder to supply the place of an air-pump. For this purpose he employs two condensers. While the steam is above atmospheric pressure, it escapes and blows through one condenser, clearing it of the results of the previous condensation: as soon as in its progressive reduction it has come down to atmospheric pressure, it is turned into the other condenser, and there meets with a jet which, together with the coldness of the condenser itself, which is immersed in water, quickly destroys its elastic power. At the next stroke, the functions of the two condensers are reversed: the steam is turned first into the second condenser (the jet of which is then turned off, and its cistern empty), and forces its contents out of the valve in the bottom; the steam remaining after this operation is turned into the other condenser, where there is a good vacuum to begin with — in consequence of the time which has elapsed since the steam was admitted into it. The vacuum, instead of being formed as usual during the passing stroke, is in fact the result of the previous stroke. The attention of *Mr. Pilbrow* has also been turned to the subject of condensation. In his plan the ordinary condenser and air-pump are replaced by a cylinder of the same size as the steam cylinder, in which is a piston working reversely to the steam piston, *i. e.* being at top when that is at bottom, and *vice versâ*. The steam to be condensed is admitted alternately to the top and bottom of this cylinder, where it meets with a jet, by which it is condensed. The steam from the bottom of the steam cylinder is admitted to the bottom of the condensing cylinder, when, of course, the steam piston is descending and the condenser piston rising. The vapour which unavoidably occupies the condenser on any plan, and which opposes the descent of the steam piston, assists just as much the ascent of the condenser piston, the rod of which, like that of the steam piston, is attached to the working beam; by which arrangement an important loss of power in engines of former construction is supposed to be avoided. Besides this, the vacuum beyond the condenser piston, which is the real working vacuum of the engine, is better than in engines of the common construction, from the length of time allowed for its formation, as in the case of *Henson's* engine.

The avoidance of the waste and nuisance arising from the large volumes of smoke which result from the common mode of constructing and managing *steam engine furnaces* continues to excite the efforts of chemists and engineers. The plans chiefly followed depend for their efficiency on the principle that the products of the combustion of pitcoal require for their ignition the admixture of a certain proportion of atmospheric air, and the maintenance of a certain temperature. The different contrivances are different modes, more or less judicious, of bringing this principle into action. The corporation of the borough of Leeds, said to be the most smoky town in England, have relied so strongly on the success of the plan of *Mr. Samuel Hall*, as to found on it three indictments for nuisance against the owners of as many of the largest manufactories in the place, in consequence of which, the indicted parties have consented to adopt Mr. Hall's plan. The contrivance of *Mr. C. W. Williams* differs from its predecessors in effecting a more complete admixture than they do of atmospheric air with the gaseous products of combustion; or, to speak perhaps more correctly, with the gaseous matters which result from heating the raw coal in the furnace. The inventor has ably and diligently illustrated his views by lectures and publications, and is said to have carried them into practice with uniform success in a great many instances. *Mr. Armstrong* has attempted to revive the use of a plan for destroying smoke by admitting a shower of water into the chimney, by which its impurities are washed out into any convenient drain.

Mr. W. S. Henson, in a pamphlet explaining the action of his steam engine, suggests the following explanation of the causes of many *steam boiler explosions*. He states that he has found that water held perfectly still may be *slowly* raised to a temperature considerably beyond that of boiling, and that on its then being shaken, even though but slightly, a large volume of steam is instantly formed. Mr. H. believes, therefore, that in some cases where a low fire has been burning for some time, and no ebullition has taken place from there having been no draught of steam by the engine, and little or no escape by the safety-valve, a volume of water may have become surcharged with heat. Immediately on the engine being started, or the safety-valve raised, ebullition commences, by which the surcharged water is mixed with that already at the boiling point, an immense volume of steam being thereby instantly produced. In some cases this will be produced nearer the bottom than the top of the water: the mass of water above the volume of newly formed steam is thus violently thrown against the roof of the boiler, which, if weak, gives way to the blow, but if it be strong enough to sustain the blow, the whole boiler is carried away from its seat without fracture. The remedy proposed by Mr. Henson is the use of a small safety-valve which is kept closed by the engine while in motion, but is set open by it on ceasing to work. The emission of steam by this valve, he conceives, will be sufficient to keep up the ebullition necessary to insure the due motion of the water in the boiler.

Hitherto British *steam-boats* have usually had their paddle-wheels permanently fixed on the main shaft of the steam engine;

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the operation of steering which has been effected in the same way as in sailing vessels, depending entirely on the progress of the vessel through water. It is obvious, however, that if either of the paddle-wheels could be disconnected at pleasure from the shaft, a new power of guidance would be acquired; the wheel which remained in action would give a curvilinear motion to the vessel, the convexity of the curve being toward the acting wheel. *Mr. Samuel Seaward* has devised and patented a method of effecting this desirable object, in which the true engine shaft extends only to the crank, each end carrying one side of the crank of that end; the paddle-wheel shafts being separate, and each carrying on its inner end the other side or lever of the cranks. But for the crank pin, therefore, each paddle wheel might revolve or stand still independently of the engine. The crank pin is fixed in one of the sides of the crank, and its end is received in a socket which is secured in the other, but that socket projects considerably from the face of the crank arm, and the pin does not enter it to the depth of the projection. The socket turns in the arm, and has a groove diametrically across its face: the pin is flatted on two sides in tangents to the circle it describes. When the socket is turned one way, it admits the escape of the pin along its grove. When the two sides of the crank are brought again to correspond with each other, the socket is turned, and embraces the pin. *Mr. Maudslay's* patent is for another method of disconnecting, which consists in sliding the shaft of each paddle-wheel in its bearings.

The bulkiness, weight, and alleged power-wasting property of paddle-wheels have given rise to a variety of inventions, designed to supersede them. The screw of one turn, adapted to the "*Archimedes*," has been followed by the propellers of *Captain Ericcson*, *Mr. Hunt*, *Mr. Blaxland*, &c. &c., all which, however, are, like the screw of the "Archimedes," modifications, more or less judicious, of the principle by which the sails of a windmill are propelled by a stream of air acting perpendicularly to their plane. By the plan of *Mr. Hunt*, the propeller is combined with and forms part of the steering apparatus. *Mr. Rennie* professes to have improved very greatly the efficiency of paddles by simply giving them a *trapezoidal* instead of a *rectangular form*; the principle on which this asserted effect depends is not, however, at present, very clear.

Accidents on Railroads have led to various attempts to improve the signals, and the control over the engines and train, and to prevent, by other means, the disastrous consequences of collision or derangement. It is true that, all things considered, travelling by railway is safer than that by stage coach; but its yet unaccustomed novelty, and the frightful consequences which might happen from the high velocities now used, give great intensity and effect to the alarm kindled by railway accidents. The signal plans of different inventors differ rather in detail than in principle; the intention in nearly all of them being to make the train put in motion an apparatus which shall show how long ago it passed. In addition to this, *Mr. C. Hancock*, who has so perseveringly followed up his designs for steam carriages to run on carriage roads, has devised an apparatus by which, when put in working position by a policeman or other attendant, the steam of a passing train can be cut off, its breaks be let down, and its whistle be sounded, independently of the engine-driver. *Mr. E. A. Cowper* proposes to fix a maroon on the rail when a signal of danger is required; the "promethean" within which, being crushed by the passing train, causes its explosion. Authorities of great weight differ as to *breaks*: Mr. Brunel wishes to make that on the engine or tender sufficient for the whole tram; to this it is objected, that the unchecked momentum of the carriages forming the hinder part of the train will force them violently, and dangerously, against each other. *Mr. G. Stephenson*, on the other hand, attaches great importance to self-acting breaks; for accidents happen commonly in a time too short to allow the breaksmen to put them on.

Two contrivances for *raising of water*, patented by *Mr. Hall* and *Mr. Adcock*, have attracted very considerable attention. Mr. Hall has revived, with improvements, the use of the rope pump. In his hands it has become a very efficient instrument. The water is lifted by its adhesion to a rapidly revolving band which passes under a pully within the water, and over one at the point of discharge. In passing over the upper pully, the centrifugal force throws off the water into a cistern, from which it runs in a copious and continued stream. *Mr. Adcock* was led to his invention by observing that drops of rain rarely fall (from whatever height) at a velocity of more than 12 feet per second. It occurred to him, therefore, that if water to be raised were divided into drops like those of rain, and placed in an upward current of air, whose velocity was greater than 12 feet per second, they would be carried upwards. A slight condensation of air gives it a velocity of escape much beyond this; he therefore employs a fan to condense air in a vessel, the efflux of which in an up-cast pipe carries with it the water to be raised, which is submitted to its action in the form of spray. The credit of large practical success is claimed for the invention.

The improved use of *water, as a moving power*, is the object of Messrs. *Whitelaw and Stirrat's* patent water mill. It is a modified form of Barker's mill, a contrivance, the effect of which has given rise to much difference of opinion amongst theorists of great note. In the old and common

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form of the mill, the arms are radii; the water in passing along acquires at every step a new and useless velocity, at the cost of much of the power of the machine. In the improved engine, these arms are curved in such a manner that when the machine is moving at its best and intended speed, the water, in passing along them, really passes along the radius on which it originally set out: the large waste of power pointed out above is thus avoided. The test of practice seems to confirm the soundness of the theory on which this contrivance is founded. A good many mills have now been erected on this plan, and are stated to be working with great success.

Electrotype is now used not only for its original purpose of obtaining metallic facsimiles, but for covering one metal with a surface of another, as in gilding, silvering, &c. The patent of *Mr. Spencer* of Liverpool, with whom the art originated, includes, with other things, its application to these purposes. *Mr. Parkes* of Birmingham has a patent for several analagous uses of the art.

Tool-making was, until lately, an occupation of limited extent, and little note. It has lately been approaching its deserved importance. The history of nearly all manufactures, and of more than one of the sciences, shows that a correct knowledge of nature, and a useful application of her powers, has commonly waited for, and been consequent on, the construction of improved tools and instruments; and chiefly on improved methods by which forms of greater accuracy could be given to metals, and other solid materials. The greater efficiency of our manufactures on the grand scale depends mainly on giving encreased accuracy to extensive surfaces, large masses, and great numbers of individual small pieces, without incurring the expense of minute attention and tedious working. Among the foremost improvers in this department have been the late *Mr. Maudslay* and the *Messrs. Whitworth* of Birmingham. *Mr. Bodmer* of Manchester's patented improvements in this line include also some of great value, particularly those in screwing stocks and lathes, drilling machines, joint tools, &c.

Wood Pavements continue to extend. The trials to which they have been subjected prove clearly that the stability of pavements depends not on the shape or interlocking, however artificial, of the blocks, whether of wood or stone, composing the pavement itself; but on the firmness of the foundation on which they are laid. In the better specimens recently laid down in the metropolis, a foundation of several inches thick of concrete, made with cement, has given proof of its sufficiency, by the pavement retaining a beautiful evenness. No kind of block has succeeded where this precaution has been neglected, as might easily have been proved beforehand would be the case. The surface of every piece of wood pavement in the metropolis is shamefully neglected. The mud composed of the grindings of stone pavement, or macadamised metal, is carried on to it from each end by the passing vehicles, and, in some states of the weather, is converted into a covering as smooth and slippery as butter. When wood pavement is dry and clean, so that the shoes of the horses press actually on the wood, there is no slipperiness which ought to be considered as detracting from the great advantages of this material for pavements. When it is thoroughly wet, and not dirty, the same remark is nearly true: thorough cleanliness is therefore indispensible to a fair trial, and the ultimate success of wood pavement; and that cleanliness may be effected now without much expense, and will be accomplished still more cheaply as the length of each plot of wood pavement in use extends. A *small* quantity of fine sand spread daily on the surface might do good. Some projectors are cutting grooves to prevent horses from slipping, without reflecting that the shoes of horses are rarely, for many days together, in a condition to take advantage of the grooves.

THE WOOLLEN, SILK, LINEN, AND COTTON MANUFACTURES.

1. *The Woollen Manufacture.*

The clothing of the people of England, from the time of the Roman invasion, when they wore skins, to that of Edward III., was, in all probability, partly supplied by a rude domestic manufacture, and partly procured from abroad. Broad cloths, it appears, were produced in England in or soon after A.D. 1200. English wools were exported in large quantities to Flanders, where the manufacture had attained greater maturity. A duty was levied on its exportation, which seems to have been imposed and increased by the arbitrary will of the king, and often gave rise to discontents. On one occasion, a subsidy was needed in a shorter time than was necessary for raising it in money; it was therefore taken for the most part in wool, which was sold to foreign manufacturers. Edward III., whose wars and connections in the Netherlands had brought him acquainted with the arts and trade of that country, and who probably had been vexed, like his predecessors, with quarrels between his subjects and the Hansards (merchants of the Hanse Towns) settled in London, invited over Flemish artisans, and passed laws protecting them from the foolish and brutal jealousy of the populace. He went further, however, and prohibited both the importation of foreign cloth and the export of English wool; but this enactment proved almost inoperative, and was soon afterwards repealed. The

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prohibition of the export of wool was, however, after several changes, effectually enforced in 1660. It is proved, however, that the manufacture made by far the greatest progress in the reign of Elizabeth, when the exportation of wool was entirely free. The prohibition to export English wool was abolished in 1825. It was maintained so long, only through the prevalence of a most erroneous idea that England alone produced the wool necessary for the more important manufactures.

Foreign wool was imported in small quantities as early as the thirteenth century, and its importation was quite free down to 1802. In that year, however, a duty of *5s. 3d.* per cwt. was imposed. In 1815, the duty was raised to *6s. 8d.*, and in 1819 to 56*s.* per cwt., or *6d.* per lb. The latter duty was evidently intended as an absolute and infallible protection to the English grower. Its injurious effect was found, however, to be so great, that in 1826 it was reduced to *1d.* per lb.; and the price of English wools has been *higher* ever since. The quantity of wool imported in the year 1839, and retained for home consumption, was 53,221,231 lbs.

During the existence of the woollen manufacture in England, many most absurd laws have been passed for its encouragement. For instance, in 1570, it was made penal to omit to wear a woollen cap on a Sunday; and in consequence of great complaints of the decay of the trade, it was enacted, in 1679, that all persons should be buried in woollen shrouds, a provision which remained in force for no less than 130 years.

The woollen manufacture of Ireland had increased considerably about the time of the Revolution; and, in 1698, the parliament of England represented to William III. that its progress injured the English manufacture; to which his majesty replied, — "I shall do all that in me lies to *discourage* the woollen manufacture in Ireland, and *encourage* the linen manufacture, and to promote the trade of England." To appreciate duly the wisdom and patriotism of this *king's speech*, we have but to change the localities, and suppose his majesty speaking in this wise: — "I shall do all I can to *discourage* the growth of the iron manufacture in Staffordshire, where there is plenty of iron and plenty also of coal to smelt it with, and to *encourage* the maintenance of it in its ancient localities of Kent and Sussex, where there is no iron, but plenty of wood; and by so doing, — that is, by encouraging one part of the kingdom at the expense of the other, — I feel confident I shall best promote the general prosperity of England!" The Irish parliament, not to be behindhand with the English sovereign in rationality, passed an act forbidding the exportation of Irish woollen cloths to any other country except England, *where prohibitory duties were already laid upon them.*

It was not, however, only against foreigners and Irishmen that the woollen manufacturers of those days asked for protection. In 1553 an act was passed, which, after reciting that "the city of York afore this time was upholden principally by making and weaving coverlets," and that "that manufacture having spread, was thereby debased and discredited," enacts that "none shall make coverlets in Yorkshire but inhabitants of the city of York." About the same time the manufacture was restricted in Worcestershire to the county town, and four others. In 1566 the mechanics connected with the "mystery" of drapers, incorporated in the town of Shrewsbury, complained that artificers neither belonging to their company nor brought up to their trade "have, of late, with great disorder, upon a mere covetous desire and mind, intromitted with and occupied the said trade, having no knowledge, skill, or experience of the same, and do buy, commonly and daily, such Welsh flannels as is defective, and not truly made, to the impeachment and hindrance of 600 people of the art or science of sheermen or frizers within the said town." The legislature expelled the rival artisans; but, nevertheless, it was, six years afterwards, found necessary to repeal the act, for the avowed reason that "it is now likely to be the very greatest cause of the impoverishing and undoing of the poor artificers and others, *at whose suit the said act was procured*, for that there be now sithence the passing of the said act much fewer persons to set them to work than before!"

To the foregoing instances of the protection extended to the woollen manufacture, during many generations, we may add that, in commercial treaties, our negotiators were not unmindful of it; for instance, by the Methuen treaty, 1703, England bound herself to lay one third higher duties on French than on Portuguese wines, in consideration of Portugal's engaging to take English woollens in preference to those of other countries at fixed and invariable rates of duty.

In spite, however, of all these artificial aids, the exports of woollen, which in 1700 and 1701 amounted to 3,000,000*l.*, had increased in 1789 only to 3,514,160*l.* per annum. Previous to 1789 French broad cloths were entirely prohibited; but being admitted, in that year, by Mr. Pitt's commercial treaty, there was a very large importation of them, their quality being very superior to that of the English. It soon became a habit to order a coat of "French cloth," and the designation was retained in tailors' bills for years after a piece was imported for general use. The English manufacturers set to work to try whether they could not work cloth of equal quality; the result was and remains, that, excepting, perhaps, in the case of some very exquisite productions, which are scarcely ever wanted, the English cloths are better for the price than the French. England now exports large quantities to neutral

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markets, of which the French had, formerly, the exclusive supply.

2. *The Silk Manufacture.*

Silk appears to have been used in England by persons of distinction in the thirteenth century; but the manufacture was not commenced here until two centuries later. The long and comparatively peaceful reign of Elizabeth encouraged the improvement of the art and the consumption of its products; while the disturbed state of Flanders induced many foreign workmen to bring hither their skill and industry. The silk throwsters of London formed a fellowship in 1552, and were incorporated in 1629. The civil wars injured the manufacture; but in an act of parliament of 1666 it is asserted, that 40,000 persons were then engaged in it. The revocation of the edict of Nantes occasioned many French artisans to settle in Spitalfields, where they introduced several improvements. Down to this period the trade in silks was nearly free. Occasionally, indeed, the importation of them was prohibited; but, even when the prohibition was enacted, it was never rigidly enforced, and for the greater time the restriction did not exist at all. The revocation of the edict of Nantes took place in 1685: from that year to 1692 the annual value of the silks imported was from 600,000*l.* to 700,000*l.*, and it was precisely during those years that the English manufacture made the most rapid advances. In the last-mentioned year, however, the French refugees obtained a patent, giving them an exclusive right to manufacture lustrings and *à-la-modes*, the articles then in greatest demand. In 1697 parliament passed an act, on their petition, prohibiting the importation of all French and other European silk goods; and, in 1701, the silks of India and China were put under the same ban. In 1719 Sir Thomas Lombe and his brother obtained a patent for throwing silk by machinery, of which the plans had been furtively obtained from Italy. He was afterwards refused an extension of the term of his patent, but had 14,000*l.* awarded him by parliament. To protect the manufacture thus created, enormous duties were laid on thrown or organised silk; and the necessity of continuing that protection furnished, for a century, a reason for continuing the duties.

Duties and prohibitions seem, however, not to have secured to the English manufacturer of silk the vigour and prosperity it had under the free system which prevailed previous to the immigration of the French workmen. Nor, indeed, was it found possible to enforce practically the prohibition. Many acts were passed, and great efforts made, for this purpose; but after all, it appears that the average export of silks from France to England, and smuggled, of course, into this country, during the period from 1688 to 1741, amounted to 500,000*l.* a year. In 1763 attempts were made to check the prevalence of smuggling, and the silk mercers of London recalled their orders for foreign goods. The existence of these orders, apparently as matters of regular business, is a tolerably strong proof of the inutility of the prohibition. In 1766 a committee of the privy council ascertained that smuggling was carried on to a greater extent than ever, and that 7072 looms were out of employment; but they reported, at the same time, that the French were decidedly superior to us in some branches of the trade, though we were at least equal to them in others; and they recommended, therefore, still more rigid restrictions. In 1773 the workmen obtained from the legislature the celebrated Spitalfields Act, by which the prices of their labour were to be fixed by the magistrates of Middlesex; masters and men were restricted from giving or taking more or less than the fixed prices, and the masters were liable, in heavy penalties, if they employed workmen out of the district. About 1785 the use of cottons, then but newly made in England of a suitable kind, began to affect the demand for silks, and the workmen found that the act they had themselves procured, and in whose protection they had so much exulted, was the very means of preventing them from competing successfully with their new rival; for it forbade their working on terms by which alone it could be done. In 1793 upwards of 4000 Spitalfields looms were quite idle; but in 1798 the trade began to revive, and it extended slowly until 1815 and 1816, when it was again visited with extreme distress.

It was not until after the act of 1773 had deprived Spitalfields of its freedom, that the manufacture of silk attained any important magnitude in *other* parts of the kingdom: nor even then did their rivals start up soon; for the cotton trade engrossed the attention and means of men. After the termination of the late war, and of the distress occasioned by a return towards natural prices at the end of it, Manchester, Macclesfield, and some other towns took up the business; they were unfettered by the act which the London workmen thought their best defence, and Spitalfields accordingly suffered as much or more from their rivalry than from that of Lyons.

In 1824 this most unjust and impolitic act was repealed.

In 1826 Mr. Huskisson proposed and carried his celebrated measure for the admission of foreign silks, on payment of considerable duties. The English manufacture, instead of advancing in quality and productiveness—as, under the healthy stimulus of competition, every unfettered branch of British industry has ever done—had barely kept its place. Many and loud were the complaints of distress among those engaged in it; and grievous, in fact, were the fluctuations to which it was

exposed. Foreign manufacturers were adopting and profiting by improvements, which, under the fancied protection of our prohibitory laws, the English maker neglected. It was not without strong resistance, and most positive predictions of total ruin on the part of the English manufacturers, that this change was made. The effect, however, has been, that the English production has doubled in quantity, and greatly improved in quality. Since 1828 we have had a gradually increasing export trade of certain kinds of silk to France; and the French are so sensible of the improvement in English silks since that period, and of the cause of it, that a high authority at Lyons has suggested the desirableness of forbidding the export of French silks to England. The English export of silk goods to all the world, which in 1827 was 236,113*l.*, had increased gradually to 865,768*l.* in 1839.

It is gratifying, however, to observe the spread of sounder principles among the persons engaged in this valuable pursuit. An eminent manufacturer declared before the late Committee on Import Duties, that, if all other trades were free, he would be ready to take his chance of the system. It is believed that a further reduction of the import duty would rather benefit than injure the English manufacturer, while it would discourage smuggling, and improve the revenue. It seems that, from 1827 to 1838 inclusive, out of every 100 lbs. weight of silk manufactured goods, exported from France to England, 52 lbs. only passed through the English custom-houses; the other 48 lbs. were smuggled. The silk trade of France, which has always been the dread of our manufacturers, is protected only by duties of from 13 to 15 per cent.; and Switzerland, which has no protection at all, can and does export several kinds of silks and ribbons into France, and pays the duties.

It has already been said that, for the protection of Sir Thomas Lombe's speculation, very heavy duties were laid on foreign organzine. After several reductions, the enormous sum of 14*s.* 7½*d.* per. pound remained of those duties in 1824. As a part of the general measure for the admission of foreign silks, the duty was at once reduced to 7*s.* 6*d.* per pound, and afterwards to 3*s.* 9*d.*, 2*s.*, and 1*s.* 6*d.*, according to quality. According to the notions of restrictionists, this reduction of duty on the foreign article ought to have annihilated the home manufacture. The least which could have been anticipated was, that the greater demand for thrown silk consequent on the doubling of the English production noticed above, should have been supplied by the foreign throwsters. See, however, how the fact stands. In the six years preceding the alteration of the law, the importation of thrown silk was 444,294 lbs. per annum; in the seven years, from 1833 to 1839 inclusive, the average importation was only 250,000 lbs. per annum. The improvement of the English machinery, when stimulated by competition, accounts for this remarkable tact.

The history of the ribbon manufacture abounds with details equally instructive. Of these, however, we have only space for the following: — In 1723 English ribbons were favourites in Paris, and French ribbons in London, while each country prohibited the importation of the ribbons of the other. Savary, the French inspector-general of manufactures, while stating this fact, assigns the superiority to the English ribbons, saying that they excel in London in this art, and that the Paris ribbons "are not very inferior." In 1713, French and Italian manufactured silks were admitted under considerable duties, which may account for the English proficiency. In 1765, the ribbon manufacturers procured the re-establishment of the prohibitory system, which continued in force to 1825. Now, in 1832 a Coventry manufacturer stated to a committee of the House of Commons that he had seen "patterns of ribbons made from fifty to one hundred years ago in England, wider, richer, and of larger figure than were made just prior to the introduction of French ribbons in 1826." Mr. Ellice, the member for Coventry, affirmed in his place in the House of Commons in 1826, that the 9700 looms in Coventry were of the worst possible construction; that the improved loom in France would, in a given time, produce five times as much ribbon as the common loom in England with the same manual labour; and asked, "what chance the English manufacturer had of maintaining a successful competition?" This, it should be remembered, was after, and evidently was the consequence of, sixty years of strict protection. The best ribbons France makes now are those intended for the English market; and though the importation of them has increased, the home manufacture has increased also; and vigorous efforts have been made, and are now being made, to improve the machinery employed.

There is every reason to conclude, that if France retain that portion of the trade for which her taste and climate pre-eminently fit her, England will secure that much larger part which depends on skilful management, superior machinery, and greater capital.

3. *The Linen Manufacture.*

Interference of another kind distinguishes the history of the linen manufacture. From the reign of William III. almost to the present time, this branch of industry has been an object of regulation, bounty, and special encouragement. At the Revolution a bounty on the shipment of linens was granted, which subsequently varied from ½*d.* to 1½*d.* per yard, according to the value and quality of the article. In 1829, after some reductions, the amount thus paid out of the public taxes for the encouragement of this manufacture was

about 800,000*l.*, or one seventh part of the entire value of the linen exported during the year. This system, which had lasted for a century, was not finally abolished till January, 1832. Mr. M'Culloch asserted, in 1834, his belief that if the sums thus expended in injudicious attempts to force the manufacture had been laid aside with their accumulation at simple interest, they would have furnished a fund whose annual interest would have been little, if at all, inferior to the entire value of the linens we then sent abroad.

If the bounty, on the whole, really did any thing towards the encouragement and extension of the trade, its cessation ought to have contracted or destroyed it. Since that time an astonishing change has, indeed, taken place in the trade, but not one of that kind. The exports to France, which in the year 1831 (the last in which the duty was paid) amounted to only 102,642 yards of cloth and 17,565 lbs. of yarn, in 1839 had reached to 6,259,476 yards of cloth, and 12,259,254 lbs. of yarn; the total value being in the former year 9,350*l.*, and in the latter 800,973*l.* The increase of the general amount of exportation is, of course, not in this extraordinary ratio, but is quite sufficient to show that the bounty was, at best, a much less effectual promoter of commerce than the improvements in machinery for spinning and weaving, which have been largely introduced since it was withdrawn. In 1831 the declared value of the linens exported was 2,461,704*l.*; in 1839 it amounted to 3,292,220*l.*

4. *The Cotton Manufacture.*

Not only is the raw material of this manufacture a product foreign to the soil of England, but the adaptation of that material to nearly every possible purpose of use and elegance had been effected by other nations long before the substance itself was known here. The manufacture existed here for some time before 1641, but was necessarily confined to coarse and common goods; fustians were the principal product. Nor does the home production seem to have excited much alarm or opposition, or, indeed, attention of any sort, for some time after the date above given. The imperfect spinning machinery then in existence was incapable of supplying the quantity, quality, and variety of thread necessary to an extended trade. But the hostility of the woollen and silk weavers did not allow the new fabrics to gain their place quietly, for in 1680 they mobbed the East India House, in revenge for a large importation the Company had made of Malabar chintzes. The rivalry, however, of the two East India Companies then existing, having occasioned a much larger importation of oriental productions than had previously existed, there came, amongst them, many of the beautiful calicoes, muslins, and silks of Hindostan. The makers of the old fabrics took the alarm at the spreading taste for these foreign articles, and for *their* protection (for be it observed no such articles were yet made here) the importation of such goods was, in 1700, totally prohibited. A taste for the showy cotton fabrics of the East had, however, been created, to supply which, print works were set on foot in England, which operated on plain calicoes brought from Hindostan, and admitted here under a duty. In 1712 a duty of 3*d* per square yard was laid on the printing of calicoes; and in 1714 it was doubled. Even this small, circuitous, and burdened rivalry was too much for the forbearance of the vested interests of the day, and in 1721 an act was passed prohibiting the use or wear of printed calicoes, whether printed in England or elsewhere. However, this act did not prohibit the printing of linens, which were now substituted for the gay cottons which had so effectually revolutionised the prevailing taste. And those linens paid only half the duty which had been laid on calicoes. It might almost seem that it was intended to banish the use of cotton from England; it is, indeed, not improbable, that had not printed linen been substituted for printed cottons, and had not the legislature in its great mercy excepted from the operation of the statute, calicoes dyed all blue, muslins, neckcloths, and fustians, the usage of the people, as to wearing apparel, would have been repressed to its state in the preceding century. Happily for us, other European governments judged no better than that of England: prohibitions equally severe and long continued excluded the cheap and brilliant tissues of India from any possible competition with the sober homespuns, or cherished manufactures of the Continent. For instance, it was not until 1759 that chintzes or printed linens or cottons were allowed to be worn in France, and then not without a most frantic opposition on the part of the manufacturers of other cloths, whose woful predictions proved to be singularly fallacious. In 1736, however, it was allowed in England to print goods of a mixed kind, containing cotton; and thenceforth cloths were made and printed of linen warp and cotton weft. Practically, this was as great an extent of legislative permission as the trade was in a condition to profit by; for it was not until long after this time that the art of spinning was so far advanced as to supply cotton thread fit for warp.

About this time, however, invention began to remodel the trade, and with it came the troubles of inventors. In 1738, Mr. John Kay of Bury invented the fly shuttle, and his son, in 1760, the drop box; but such was the persecution to which the former was consequently exposed, that he left his native country and went to reside in Paris. These inventions, and particularly the former, by doubling the production of web only, added to the difficulty of carrying on the manufacture, which arose from the deficient supply of thread. In 1738,

one of the many sons of genius, whose powers seem only to produce for them tantalising visions to become substantial splendours in the hands of others. John Wyatt, took out a patent for spinning by rollers, an idea which slept, it seems, for thirty years, and then, with new combinations, and under more favourable circumstances, made the fortune and the fame of Arkwright.* Hargreaves of Blackburn, about 1764, added that important invention, the jenny, to those then in use for spinning; but he got for his pains only the hatred of his neighbours, and the destruction of his machine. Fifteen years after, lawless mobs destroyed the jennies, which had begun to supply thread, and extend the business; and the rising trade was compelled to desert for years the locality of its origin. The inventor himself, driven from his home, went to Nottingham, and prosecuted his invention on a scale but little betokening the magnificent extent it has since attained. Up to this time, the great object of pursuit was a *sufficient supply* of cotton yarn of common qualities to keep the weavers at work, and supply the demand for the mixed fabrics of linen and cotton then in use; but the inventions of Arkwright and Hargreaves had now overcome that difficulty. Rival manufacturers, however, attacked the patent of Arkwright, and not only established large spinning factories in opposition to him, but brought his patent repeatedly into court, and at length succeeded in having it declared void. The merit of Arkwright being, perhaps, less that of an inventor than of an enterprising, judicious, and indefatigable man of business, his success in money-making was scarcely checked by the loss of his patent. He had succeeded in producing cotton yarn, not only fit for weft — the only use to which it had been yet appropriated — but capable of supplanting linen thread for warp. But the manufacturers, whose hostility and party feeling had been roused and embittered by the disputes about the patent, effectually combined to exclude his cotton warps from the market: he was thus compelled to convert his accumulated stock into manufactured goods, which then, for the first time in the history of English industry, consisted of cotton, both in warp and weft. But he was here met by the old enactment of 1721, which prohibited the use of printed calicoes (which these strictly were), whether printed in England or abroad. In this extremity Arkwright and his partners applied (1774) to Parliament. The generation of silk and woollen weavers, who, fifty-three years before, obtained the proscription of Indian finery, had, by this time, mostly slept with their fathers, and their successors had become accustomed to the sight of the gay draperies supplied by the mixed fabrics which the law had allowed to be printed. It was not by them, therefore, that Arkwright was hindered in his attempts to obtain the removal of the old restriction. But the manufacturers of Lancashire, partly incited by their old hostility, and partly, in all likelihood, fearing the effects of the change on their own establishments, then arranged for the supply of mixed fabrics, offered the most strenuous obstruction; in spite of which, however, an act was passed declaring, that, "Whereas a new manufacture of stuffs, made entirely of cotton spun in this kingdom, has lately been introduced, and some doubts are entertained whether it be lawful to use it, it is declared to be not only a lawful but a laudable manufacture, and is therefore permitted to be used on paying 3*d.* per square yard when printed, painted, or stained with colours." Perhaps few facts in the history of industry are more curious than the opposition of the Lancashire manufacturers of that day to the very measure which has led, in our own times, to the astonishing increase and perfection of their establishments. No greater misfortune could have happened to them than their own success.

From 1721 to 1774 the existence of the cotton manufacture, so far as the law was concerned, depended on the mere excuse that it was wanted to weave with linen. Born almost in stealth, and nursed in storms, in its cradle almost strangled by jealousy, and in its youth reduced to beg a name and a pretence for life, it forced off, one by one, the shackles which bound its rising strength, and stood out at length a member, feared but acknowledged, of the great family of arts. From the day when the fabrication of purely cotton webs was first made free, its progress has been one continued and unparalleled series of improvements and extensions.

In 1779 that stripling trade, so lately discouraged and so recently set free, was thought able to bear an additional duty of 5 per cent. on the 3*d.* per yard previously laid on the printing of calicoes; and this was followed, in three years after, by another addition of equal amount. Again, in 1784, to repair the finances of the country, exhausted by the American war, this youngest progeny of art and industry was called on to bear burdens of more than double the former amount, some of which were laid on goods which were only *bleached!* Very reluctantly, and in consequence only of most urgent representations, did the ministry of the day repeal those duties, and then only to re-impose on printed goods such duties as doubled the amount they previously paid. In 1787 the duties and per centages were consolidated into one charge of $3\frac{1}{2}$*d.* per yard on all cotton, linen, or mixed goods, when printed

* We follow, in this, the narrative of Mr. Baines in his valuable History of the Cotton Manufacture; but see, on this head, a review of that work in the *Mechanics' Magazine*, vol. 22. p. 424. where the claims of Wyatt are very strongly, though not, perhaps, quite conclusively, controverted.

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or dyed, and those duties continued until 1831.

When, at length, this extraordinary manufacture had outgrown its early discouragements, and had forced for itself an admission into the arts and wants of daily life, the legislature very needlessly stepped in with its officious help. In 1787 — that is, seven years after it had become lawful to make calicoes in England, and some time after the inventions were in use which contained the elements of all the subsequent progress — duties were laid on Indian dimities, calicoes, muslins, &c., which were gradually raised to 75 per cent. *ad valorem*. In 1788 bounties were given on the exportation of English printed cottons. The bounties continued for more than thirty years, and were repealed, without opposition, as utterly useless. The duties remained until 1825, when they were reduced to 10 per cent. *ad valorem*. It is very probable that in this, as in every other instance, the duty intended to be protective produced exactly the opposite effect; for the importation which formerly was effected, in all likelihood, by smuggling, came through the customs, in 1826, to the gross amount of 110,355*l*.; the year following it reached 115,026*l*., and has been declining ever since. It amounts, now, to little more than one fourth of its original value.

For fiscal purposes, duties of various amounts have been levied, however unwisely, on the raw material, from 1766 to the present time. In 1833 the duty was reduced to its present almost nominal amount of 4*d*. per cwt. on cotton from British possessions, and 2*s*. 11*d*. on that from other countries. Of the former, the importation is trifling; the amount of the latter, in 1839, was 4,166,208 cwts., of which 3,770,524 cwts. were retained for home consumption, and produced a revenue of 552,665*l*.

The present state of the cotton manufacture is, perhaps, the most remarkable phenomenon in the whole history of social life. The exquisite sensibility of touch — the habitude, continued and improved through many generations — the untiring patience, the costless living of the Hindoos, who weave the cotton in the very field where it grows — are beaten in their own market by the unfailing industry of men who carry the material 18,000 miles, subject it to ponderous and novel machinery, in a highly taxed and luxurious country, and return it again over 18,000 miles more, to be worn on the spot where it grew. A loom and other stock costs the Hindoo weaver about 24*s*., and the hands employed earn 2*d*. or 3*d*. per day; and yet, in 1831, the merchants of Calcutta petitioned that English goods should pay the same duty on importation into India as Indian goods pay here, stating, at the same time, that they had very little hope that they would derive any great advantage from the boon, since the use of machinery enabled the British manufacturer to undersell the unscientific manufacturers of India in their own country! And yet even this poor boon was refused!

The seeds of this plant have been carried across oceans as the certain germs of future wealth; an importance conferred upon them by the machinery of England, which struggled into existence amidst poverty, frowns, and penalties. Kingdoms and states now derive their riches from the cotton plant.

It forms the most important item of the largest export trade the world ever saw. Of fifty-three millions of pounds in value which, in 1839, Great Britain exported, twenty-three millions at least were cotton manufactures; and its use at home has increased in a corresponding degree with the extent of its exportation.

All this has been done, not through protection, but in defiance of it.

If the cotton manufacturer of England has rivals to fear, they are not the protected fabrics of France, nor even those of America. Of the former it is enough to say that its government first prohibits foreign goods, and then pays a bounty on the exportation of their own, and that, after all, no other department of French industry is liable to fluctuations so great or so ruinous to employers and distressing to workmen, for they never find an outlet for their surplus manufactures in countries where they must compete with ours. The silk manufacture of France, unfettered and unforced by protection, flourishes in marked contrast by its side.

The only rival England has to fear is Switzerland, which has no tax on import or on export — Switzerland, of which, in 1840, Mr. M'Gregor gave evidence before the House of Commons' Committee on the Import Duties, to this effect: — "They never turned their attention to manufacturing upon any extensive scale till 1814; their cost of carriage is double that of our Lancashire or Lanark manufacturers; but their cotton goods come into competition with ours, and meet us with very great advantage in our eastern markets; and are sent to the United States and Brazil in large quantities." Dr. Bowring adds, "Undoubtedly her disadvantages are peculiar; but those are more than compensated by the general principles of her legislation."

The cotton manufacture has also added another tie to those by which in modern times nations have been restrained from murderous war. America must sell her cotton; and England, to keep her population employed, must buy it. It cannot be doubted that this obvious and mutual necessity has recently done much towards preventing the contest which unquiet spirits would fain have brought on. This happy result of international dependency is a striking illustration of the consequences which would result all over the world from unrestricted freedom of exchange.

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NEW POST-OFFICE REGULATIONS.

All letters from one part of Great Britain to another (including the Local Penny Posts and the London Twopenny Post), are to be charged by weight as follows, if prepaid: —

Not exceeding ½ an ounce . . . . . 1*d.*
Exceeding . . ½ an ounce, and not exceeding 1 ounce . 2*d.*
——— 1 ounce ——— ——— 2 ounces, 4*d.*
——— 2 ounces, ——— ——— 3 ounces, 6*d.*

and so on at the rate of 2*d.* for every additional oz. or fraction of an oz.

The postage can either be paid in money; or, by using stamped envelopes or adhesive stamps, of 1*d.* and 2*d.* each respectively, which may be purchased at all Post Offices and of most booksellers and stationers. For letters not exceeding 1 oz. either envelopes or stamps can be used, but for letters *above that weight*, adhesive stamps should be used.

Unpaid and unstamped letters, to be charged double postage on delivery; letters insufficiently paid or stamped to be charged double the amount of such insufficiency on delivery.

Letters or packets exceeding 16 ozs. in weight not forwarded — *except*,

Parliamentary petitions and addresses to Her Majesty,
Parliamentary proceedings,
Letters or packets addressed to, or received from, places beyond sea,
Letters or packets to and from public departments, and public officers heretofore franking by virtue of their office,
Deeds — if transmitted under certain regulations.

No person can send or receive letters *free of postage*. All franking abolished.

Members of either House of Parliament receive *free of charge* petitions to parliament, if sent without covers or in covers open at the ends, and not exceeding 6 ozs. in weight.

Sums not exceeding five pounds may be remitted through the money-order office, which is open daily from ten to five. The same accommodation is furnished by the deputy post masters. A charge of three-pence is made for an order of two pounds and under, and of sixpence for any sum between two and five pounds.

Letters containing remittances for sums above 5*l.* may be registered on payment of one shilling in addition to the ordinary postage; and for this fee the office guarantees their safe delivery.

The rates on letters to soldiers and sailors, remain unaltered; *except* that the privilege is now restricted to letters not exceeding half an ounce in weight.

The London Receiving Houses are now closed at 5 o'clock, *except* the branch offices at Charing Cross, Old Cavendish Street, and the Borough, which are closed at ½ to 6. That in Lombard Street, and the chief office in St. Martin's-le-Grand, are closed at 6. Letters, however, are received at the chief office till 7 o'clock on payment of a fee of 1*d.* for each, and until ½-past 7 on payment of a fee of 6*d.* for each.

RECEIPT AND BILL STAMPS.

	£	s.	d.
Receipts for £5 and under £10	0	0	3
..... 10 20	0	0	6
..... 20 50	0	1	0
..... 50 100	0	1	6
..... 100 200	0	2	6
..... 200 300	0	4	0
..... 300 500	0	5	0
..... 500 1000	0	7	6
..... 1000 or upwards	0	10	0
Receipts in full of all demands	0	10	0

Bills and Promissory notes, not exceeding two months after date, or sixty days after sight.									For a longer period.		
If	£5	5		£20	0	.....	£0	1	6	...	£0	2	0
Above	20	0		30	0	.....	0	2	0	...	0	2	6
Above	30	0		50	0	.....	0	2	6	...	0	3	6
Above	50	0		100	0	.....	0	3	6	..	0	4	6
Above	100	0	and not	200	0	.....	0	4	6	...	0	5	0
Above	200	0	exceeding	300	0	.....	0	5	0	...	0	6	0
Above	300	0		500	0	.....	0	6	0	...	0	8	6
Above	500	0		1000	0	.....	0	8	6	...	0	12	6
Above 1000		0		2000	0	.....	0	12	6	...	0	15	0
Above 2000		0		3000	0	.....	0	15	0	...	1	5	0
Above 3000		0					1	5	0	...	1	10	0

*** Bills of exchange, accepted upon protest for honour, coming due on Sunday, Christmas Day, or Good Friday, are not payable till the day *after*, and not the day *before*, as was heretofore the case.

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TABLE

Exhibiting the DIFFERENCE OF TIME arising from DIFFERENCE IN LONGITUDE between the Observatory at Greenwich, and two or more principal places in each of the English Counties; also North and South Wales, Edinburgh, Dublin, and Paris.

N.B. *The letters* S. *and* F. *mean respectively Slow or Fast, and* W. *and* E. *West and East Longitude.*

		m.	s.	
Beds.....	Bedford	1	52	W. S.
	Leighton Buzzard	2	39	— —
Berks ...	Abingdon	5	7	— —
	Windsor.....	2	22	— —
Bucks...	Buckingham.....	3	57	— —
	Aylesbury	3	21	— —
Cambr..	Cambridge.....	0	23	E. F.
	Ely	1	4	— —
Chesh...	Chester	11	32	W. S.
	Macclesfield.....	8	30	— —
Cornw..	Falmouth 20		12	— —
	Truro.....20		6	— —
Cumb...	Carlisle.....11		38	— —
	Penrith.....10		56	— —
Derby..	Derby.....	5	52	— —
	Chesterfield.....	5	40	— —
Devon ..	Exeter.....14		18	— —
	Plymouth.....16		30	— —
Dorset..	Dorchester.....	9	43	— —
	Bridport 11		24	— —
Durh....	Durham.....	6	16	E. F.
	Darlington.....	6	12	— —
Essex ...	Colchester.....	4	24	— —
	Maldon	2	42	— —
	Chelmsford.....	1	52	— —
Glouc...	Gloucester.....	8	58	W. S.
	Cheltenham.....	8	16	— —
Hants...	Southampton.....	5	36	— —
	Portsmouth	4	24	— —
Heref...	Hereford 10		52	— —
	Leominster.....10		54	— —
Herts....	Hertford.....	0	16	— —
	Tring	2	28	— —
Hunts...	Huntingdon.....	0	45	— —
	Kimbolton.....	1	37	— —
Kent	Greenwich Observ.	0	0	— —
	Dover.....	5	16	E. F.
	Tunbridge Wells...	1	1	— —
Lanc.....	Lancaster..... 11		10	W. S.
	Manchester	9	0	— —
	Liverpool 11		53	— —
Leicest.	Leicester.....	4	33	— —
	Melton Mowbray...	3	33	— —
Lincoln	Lincoln.....	2	4	— —
	Louth	0	0	— —
Middle-sex.	St. Paul's.....	0	23	— —
	Hampton Court	1	20	— —

		m.	s.	
Monm..	Monmouth.....10		48	W. S.
	Abergavenny.....12		0	— —
Norf.....	Norwich.....	5	12	E. F.
	Fakenham.....	3	24	— —
North-ampt.	Northampton.....	3	56	W. S.
	Peterborough.....	0	58	— —
North-umb.	Alnwick	6	48	— —
	Newcastle	6	24	— —
Notts....	Nottingham.....	4	41	— —
	Retford	3	5	— —
Oxford .	Oxford	5	1	— —
	Chipping Norton...	6	12	— —
Rutland.	Oakham.....	3	20	— —
Salop....	Shrewsbury.....10		56	— —
	Oswestry.....12		8	— —
Somer-set.	Taunton.....12		21	— —
	Bath.....	9	26	— —
Stafford	Stafford.....	8	40	— —
	Lichfield.....	7	18	— —
	Tamworth	6	49	— —
Suffolk..	Ipswich.....	4	58	E. F.
	Bury St. Edmund's	2	53	— —
Surrey..	Guildford.....	2	18	W. S.
	Croydon	0	26	— —
Sussex..	Brighton.....	0	32	E. F.
	Hastings.....	2	20	— —
Warw...	Warwick.....	6	20	W. S.
	Birmingham.....	7	33	— —
	Coventry.....	6	1	— —
West-mort.	Kendal.....11		0	— —
	Appleby 10		0	— —
Wilts....	Marlborough.....	6	53	— —
	Devizes.....	7	55	— —
Wor-cester.	Worcester.....	8	41	— —
	Kidderminster.....	8	58	— —
Yorks...	Beverley	1	42	— —
	York.....	4	24	— —
	Leeds.....	6	4	— —
North Wales.	Holyhead.....18		36	— —
	Bangor 16		14	— —
South Wales.	Cardigan. 18		40	— —
	Carmarthen.....17		16	— —
Edinburgh		12	43	— —
Dublin		25	21	— —
Paris		9	21	E. F.

*** The above Table has been calculated by Edward J. Dent, Esq., F.R.A.S., the eminent Chronometer maker to Her Majesty, and is extracted, by his kind permission, from a Treatise by him on the Construction of Chronometers, Watches, and Clocks. The computations of Mr. Dent are carried out to several places of decimal notation; but, for the general use of this Table, it has not been thought necessary to go beyond minutes and seconds.

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ROYAL FAMILY OF GREAT BRITAIN.

THE QUEEN. — VICTORIA, (daughter of the Duke of Kent, fourth son of George III.), *born*, 24 May 1819; succeeded to the throne, 20 June 1837; *married*, His Royal Highness Prince Albert of Saxe Coburg and Gotha, 10 Feb. 1840.

QUEEN DOWAGER. — Amelia Adelaide Louisa Theresa, widow of William IV., and sister to the reigning Duke of Saxe Meinengen, *born*, 13 Aug. 1792; *married*, 11 July 1818; crowned, 8 Sept. 1831.

His Royal Highness Francis Albert Augustus Charles Emanuel, Duke of Saxe, Prince of Coburg and Gotha, K G., Consort of Her Majesty, *b.* 26 Aug. 1819.

Her Royal Highness Victoria Adelaide Mary Louisa, PRINCESS ROYAL, *b.* 21 Nov. 1840.

The PRINCE OF WALES and DUKE OF CORNWALL, *b.* Nov. 9, 1841.

Ernest Augustus, King of Hanover, DUKE OF CUMBERLAND and TEVIOTDALE, uncle to her Majesty, *b.* 5 June 1771; *m.* 29 Aug. 1815. Issue, George Frederick.

Augustus Frederick, DUKE OF SUSSEX, uncle to her Majesty, *b.* 27 Jan. 1773.

Adolphus Frederick, DUKE OF CAMBRIDGE, uncle to her Majesty, *b.* 24 Feb. 1774; *m.* 7 May 1818. Issue, George William, Augusta Caroline, and Mary Adelaide.

MARY, aunt to her Majesty, *b.* 25 April 1776; *m.* 22 July 1816, her cousin, the Duke of Gloucester, *dec.*

SOPHIA, aunt to her Majesty, *b.* 3 Nov. 1777.

Victoria Mary Louisa, DUCHESS OF KENT, mother of the Queen, *b.* 17 Aug. 1786; *m.* in 1818 the Duke of Kent, who *d.* 23 Jan. 1820.

Augusta Wilhelmina Louisa, DUCHESS OF CAMBRIDGE, niece of the Landgrave of Hesse, *b.* 25 July 1797; *m.* in 1818 the Duke of Cambridge, by whom she has issue.

SOPHIA MATILDA OF GLOUCESTER, second cousin to her Majesty, *b.* 29 May 1773.

George Frederick Alexander Ernest Augustus, only child of the Duke of Cumberland, *b.* 27 May 1819.

George William Frederick Charles, son of the Duke of Cambridge, *b.* 26 March 1819.

Augusta Caroline Charlotte Elizabeth Mary Sophia Louisa, daughter of the Duke of Cambridge, *b.* 19 July 1822.

Mary Adelaide Wilhelmina Eliz., daughter of the Duke of Camb, *b.* 27 Nov. 1833.

HER MAJESTY'S CABINET MINISTERS.

First Lord of the Treasury (Prime Minister), Rt. Hon. Sir Robert Peel.
Lord High Chancellor, Lord Lyndhurst.
Chancellor of the Exchequer, Rt. Hon. Henry Goulburn.
Pres. of the Council, Lord Wharncliffe.
Lord Privy Seal, Duke of Buckingham.
Secretary of State for Home Depart., Right Hon. Sir James Graham, Bart.
Sec. for Foreign Aff., Earl of Aberdeen.
Secretary for the Colonies, Lord Stanley.
First Lord of the Admiralty, Earl of Haddington.
President Board of Control, Lord Fitzgerald and Vesci.
Pres. of the Board of Trade, Earl of Ripon.
Sec. at War, Rt. Hon. Sir Henry Hardinge.
Treasurer of the Navy, and Paymaster-General of the Forces, Right Hon. Sir Edward Knatchbull, Bart.

His Grace the Duke of Wellington, without office.

CHIEF OFFICERS OF STATE NOT OF THE CABINET.

First Commissioner of Woods and Forests, Earl of Lincoln.
Chanc. Duchy Lanc., Lord Gran. Somerset.
Lord Lieuten. of Ireland, Earl de Grey.
Chief Secretary for Ireland, Lord Eliot.
Lord Chancellor of Ireland, Sir Edward Sugden.
Postmaster-General, Lord Lowther.
Master-Gen. of Ordnance, Sir G. Murray.
Gov.-Gen. of India, Lord Ellenborough.
Governor-General of North American Provinces, Sir Charles Bagot.
Lord Great Chamb., Lord W. D'Eresby.
Lord Cham. of the Household, Earl Delawar.
Lord Steward, Earl of Liverpool.
Master of the Horse, Earl of Jersey.
Earl Marshal, Duke of Norfolk.
Commander in Chief, Lord Hill.
Attorney-General, Sir Frederick Pollock.
Solicitor-General, Sir William Follett.

COURTS OF LAW.

COURT OF CHANCERY.

Lord Chancellor, Lord Lyndhurst.
Master of the Rolls, Lord Langdale.
Vice Chan. of England, Sir L. Shadwell.
Vice-Chancellors, J. L. Knight Bruce, Esq.; and James Wigram, Esq.

COURT OF QUEEN'S BENCH.

Lord Chief Justice, Lord Denman.
Judges, Sir John Patteson. Sir J. Williams. Sir J. T. Coleridge. Sir W. Wightman.

COURT OF COMMON PLEAS.

Ch. Justice, Sir Nicholas Conyngham Tindal.
Judges, Sir J. B. Bosanquet. Sir John Coltman. Right Hon. Sir Thos. Erskine. Sir W. H. Maule.

COURT OF EXCHEQUER.

Lord Chief Baron, Lord Abinger.
Barons, Sir J. Gurney. Sir J. Parke. Sir E. H. Alderson. Sir R. M. Rolfe.
Cursitor Baron, George Bankes, Esq.

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HOUSE OF LORDS,

[The Peers are inserted in the order of their precedence, which is regulated by the dates of their respective creations, to the highest rank, which they hold in the Peerage.]

Speaker— Right Hon. Lord Lyndhurst, Lord High Chancellor.

PEERS OF THE BLOOD ROYAL, 3.

	Created.
Ernest Augustus, Duke of Cumberland and Teviotdale (King of Hanover)	1799
Augustus Frederick, Duke of Sussex	1801
Adolphus Frederick, Duke of Cambridge	1801

DUKES, 21.

Norfolk.	St. Albans.	Rutland.	Dorset.	Buckingham and Chandos.
Somerset.	Leeds.	Brandon (*Hamilton*).	Newcastle.	Sutherland.
Richmond.	Bedford.	Portland.	Northumberland.	Cleveland.
Grafton.	Devonshire.	Manchester.	Wellington.	
Beaufort.	Marlborough.			

MARQUESSES, 20.

Winchester.	Bath (a minor).	Exeter.	Cholmondeley.	Ailsa.
Lansdowne.	Abercorn.	Northampton.	Hastings.	Breadalbane.
Townshend.	Hertford.	Camden.	Ailesbury.	Westminster
Salisbury.	Bute.	Anglesey.	Bristol.	Normanby.

EARLS, 117.

Shrewsbury.	Plymouth.	Fitzwilliam.	Craven.	Vane (*Londonderry*).
Derby.	Scarborough.	Egremont.	Onslow.	Amherst.
Huntingdon.	Albemarle.	Guildford.	Romney.	Dudley.
Pembroke and Montgomery.	Coventry.	Cornwallis.	Chichester.	Cawdor.
Devon.	Jersey.	Hardwicke.	Wilton.	Munster.
Suffolk and Berks.	Poulett.	Ilchester.	Powis.	Burlington.
Denbigh (*Desmond*).	Oxford and Mortimer.	Delawar.	Nelson.	Camperdown.
Westmoreland.	Ferrers.	Radnor.	Manvers.	Lichfield.
Lindsey.	Dartmouth.	Spencer.	Orford.	Durham.
Stamford and Warrington.	Tankerville.	Bathurst.	Grey.	Ripon.
Winchelsea and Nottingham.	Aylesford.	Hillsborough (*Downshire*).	Lonsdale.	Granville.
Chesterfield.	Cowper.	Clarendon.	Harrowby.	Howard of Effingham.
Thanet.	Stanhope.	Abergavenny.	Harewood.	Yarborough.
Sandwich.	Harborough.	Talbot.	Minto.	Leicester.
Essex.	Macclesfield.	Strange (*Athol*).	Catheart.	Verulam.
Cardigan.	Pomfret.	Mount Edgecumbe.	Verulam.	Lovelace.
Carlisle.	Graham (*Montrose*).	Fortescue.	Brownlow.	Zetland.
Doncaster (*Buccleugh*).	Waldegrave.	Digby.	St. Germains.	Auckland (*Eden*).
Shaftesbury.	Ashburnham.	Beverley.	Morley.	Gainsborough.
Berkeley.	Harrington.	Mansfield.	Bradford.	Fitzharding.
Abingdon.	Portsmouth.	Carnarvon.	Beauchamp.	
	Brooke and Warwick.	Liverpool.	De Grey.	
	Buckinghamshire.	Cadogan.	Eldon.	
		Malmesbury.	Howe.	
		Rosslyn.	Somers.	
			Stradbroke.	

VISCOUNTS, 21.

Hereford.	Maynard.	Sidmouth.	Exmouth.	Combermere.
Bolingbroke & St. John.	Sydney.	Lake.	Hutchinson—*Donoughmore.*	Canning.
Torrington.	Hood.	Gordon—*Aberdeen.*	Beresford.	Canterbury.
Leinster.	St. Vincent.	Granville.	Clancarty.	Ponsonby of Imokilly.
	Melville.			

BARONS, 223.

De Roos.	Stourton.	St. John of Bletsoe.	Clifton (Darnley).	Boyle (Cork and Orrery).
Audley.	Berners.	Howard de Walden.	Dormer.	Hay (Kinnoul).
Clinton and Saye.	Willoughby de Broke.	Grey of Groby.	Teynham.	Middleton.
Dacre.	Vaux of Harrowden.	Saye and Sele.	Stafford.	Monson.
Willoughby d'Eresby.	Paget (E. of Uxbridge).	Petre.	Byron.	Montford.
Camoys.		Arundel.	Ward.	Bruce.
			Clifford of Chudley.	

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Fortescue (Ebrington).
Ponsonby (Besborough).
Sondes.
Scarsdale.
Boston.
Holland.
Lovell (Egmont)
Vernon.
Sundridge and Hamilton (Argyll).
Hawke.
Foley.
Dynevor.
Walsingham.
Bagot.
Southampton.
Grantley.
Rodney.
Carteret.
Berwick.
Sherborne.
Montagu.
Tyrone (Waterford).
Carleton (Shannon).
Suffield.
Dorchester.
Kenyon.
Braybrooke.
Fisherwick (Donegal).
Douglas.
Gage.
Thurlow.
Lyttleton.
Mendip and Dover.
Selsey.
Stuart (Moray).
Stewart of Garlies (Galloway).
Saltersford (Courtown).
Brodrick (Middleton).
Calthorpe.
Dunstanville.
Rolle.
Wellesley.
Carrington.
Bayning.
Bolton.
Wodehouse.
Northwick.
Lilford.
Ribblesdale.
Fitz-Gibbon (Clare).
Moore (Drogheda).
Loftus (Ely).
Carysfort.
Alvanley.
Abercromby.
St. Helens.
Rivers.
Redesdale.
Ellenborough.
Sandys.
Arden.
Sheffield.
Erskine.
Monteagle (Sligo).
Ardrossan (Eglinton).
Lauderdale.
Granard.
Crewe.
Gardner.
Manners.
Hopetown and Niddry.
Lynedoch.
Hill.
Dalhousie.
Meldrum (Aboyne).
Ross (Glasgow).
Grinstead (Enniskillen).
Foxford (Limerick).
Churchill.
Melbourne.
Harris.
Prudhoe.
Colchester.
Kerr (Lothian).
Munster (Conyngham).
Ormonde.
Wemyss.
Clanbrassil (Roden).
Kingston.
Silchester (Longford).
Glenlyon.
Maryborough.
Oriel (Ferrard)
Ravensworth.
Delamere.
Forester.
Rayleigh.
Bexley.
Gifford.
Penshurst (Strangford).
Tadcaster (Thomond).
Somerhill (Clanricarde).
Wigan (Balcarras).
Ranfurly.
Farnborough.
De Tabley.
Wharncliffe.
Feversham.
Seaford.
Lyndhurst.
Fife.
Tenterden.
Plunkett.
Melrose (Haddington).
Cowley.
Stuart de Rothsay.
Heytesbury.
Roseberry.
Clanwilliam
Skelmersdale.
Wallace.
Wynford.
Brougham and Vaux.
Kilmarnock (Errol).
Fingall.
Sefton.
Clements (Leitrim).
Rossie (Kinnaird).
Dunmore.
Ludlow.
Hamilton (Belhaven).
Howden.
Panmure.
Poltimore.
Kenlis (Headfort).
Chaworth (Meath).
Mostyn.
Templemore.
Dinorben.
Cloncurry.
De Saumarez.
Godolphin.
Hunsdon (Falkland).
Stanley.
Western.
Denman.
Duncannon.
Fitzgerald and Desmond.
Abinger.
De L'Isle and Dudley.
Camden.
Ashburton.
Glenelg.
Hatherton.
Strafford.
Warlingham (Gosford).
Cottenham.
Langdale.
Portman.
Lovat.
Bateman.
Charlemont.
Kintore.
Lismore.
Rossmore.
Carew
De Mawley.
Wrottesley.
Sudeley.
Methuen.
Bruce
Beauvale.
Furnival (Talbot de Malahide).
Stuart de Decies.
Leigh.
Wenlock (Beilby Thompson).
Lurgan.
Colborne.
De Freyne (French).
Dunfermline (Abercromby).
Monteagle (Rice).
Seaton.
Keane.
Sydenham.
Beaumont (Stapleton.) *Rev.*
Hastings (Astley *Rev.*
Enniskowen and Carrickfergus.
Kenmare.
Oxenford.
Surrey.
Campbell.
Congleton.
Lowther.
Vivian.

ARCHBISHOPS AND BISHOPS, 26.

	Cons.	*Trs.*
Dr. William Howley, Lord Archbishop of Canterbury	1813	1828
Hon. Dr. Ed. Vernon Harcourt, Lord Archbishop of York	1791	1861
Right Hon. Dr. Charles James Bloomfield — London.		
Dr. Edward Maltby — Durham.		
Dr. Charles Richard Sumner — Winchester.		
Dr. Christopher Bethell — Bangor.*		
Dr. George Henry Law — Bath and Wells.		
Dr. George Murray — Rochester.		
Dr. John Kaye — Lincoln.		
Dr. William Carey — St. Asaph.*		
Hon. Dr. Hugh Percy — Carlisle.		
Dr. Edward Copleston — Llandaff.		
Dr. John Bird Sumner — Chester.		
Dr. Richard Bagot — Oxford.		
Dr. Henry Phillpotts — Exeter.		
Dr. James Henry Monk — Gloucester and Bristol.		
Dr. Joseph Allen — Ely.		
Dr. Charles Thomas Longley — Ripon.		
Dr. E. Denison — Salisbury.		
Dr. Edward Stanley — Norwich.		
Dr. Thomas Musgrave — Hereford.		
Dr. George Davys — Peterborough.		
Dr. James Bowstead — Lichfield and Coventry.		
Dr. Connop Thirlwall — St. David's.		
Dr. Shuttleworth — Chichester.		
Dr. Henry Pepys — Worcester.		

* St. Asaph and Bangor are, on the next vacancy, in either See, to be united.

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IRISH REPRESENTATIVE PRELATES, 4.

Archbishop of Armagh, and Bishops of Tuam, Derry, and Limerick.

REPRESENTATIVE PEERS.

FOR SCOTLAND, 16. — ELECTED AT THE COMMENCEMENT OF EACH PARLIAMENT.

Titles.	*Titles.*	*Titles.*
Marq. Tweeddale.	Earl Selkirk.	Baron Sinclair.
Earl Morton.	Earl Orkney.	Baron Colville of Culross.
Earl Seafield.	Viscount Arbuthnot.	Lord Reay.
Earl Elgin and Kincardine.	Viscount Strathallan.	Lord Rollo.
Earl Airlie.	Baron Forbes.	
Earl Leven & Melville.	Baron Saltoun and Abernethy.	

FOR IRELAND, 28. — ELECTED FOR LIFE.

Titles.	*Titles.*	*Titles.*
Marq. Thomond.	Earl Limerick.	Baron Dunsany — *Plunket.*
Marq. Westmeath.	(Foxford.)	Baron Blaney.
Earl Caledon.	Earl Charleville.	Baron Carbery — *Freke.*
Earl Mountcashel.	Earl of Gosford.	Baron Clonbrock — *Dillon.*
Earl Donoraile.	Earl Glengall.	Baron Crofton.
Earl Mayo.	Vt. Lorton—*King.*	Baron Farnham.
Earl Wicklow.	Vt. Gort—*Vereker.*	Baron Dunalley — *Prittie.*
Earl of Dunraven.	Viscount Hawarden.	Baron Castlemaine.
Earl of Lucan.	*Maude.*	Baron Downes—*Burgh.*
Earl of Bandon.	Visct. de Vesci.	(One vacant.)

HOUSE OF COMMONS. — ELECTED AUGUST, 1841.

(FOURTH REFORMED HOUSE.)

Speaker — Right Hon. Charles Shaw Lefevre.

ENGLAND AND WALES.

For Counties, 159; Universities, 4; Cities and Boroughs, 337 — Total, 500.

Abingdon, T. Duffield, D.C.L.
Albans, St., G. W. Repton, Earl of Listowel.
Andover, R. Etwall, Lord W. Paget.
Angleseyshire, Hon. W. O. Stanley.
Arundel, Lord Fitzalan.
Ashburton, W. Jardine.
Ashton-on-Lyne, C. Hindley.
Aylesbury, C. J. B. Hamilton, R. R. Clayton.
Banbury, H. W. Tancred.
Barnstaple, F. Hodgson, Montague Gore.
Bassetlaw, Hon. A. Duncombe, G. H. Vernon.
Bath, Visct. Duncan, J. A. Roebuck.
Beaumaris, &c., Captain F. Paget.
Bedfordshire, Lord Alford, W. Astell.
Bedford, Capt. Polhill, H. Stuart.
Berkshire, R. Palmer, Lord Barrington, P. Pusey.
Berwick-on-Tweed, Richard Hodgson, M. Forster.
Beverley, J. W. Hogg, J. Towneley.
Bewdley, Sir T. E. Winnington, bart.
Birmingham, J. Scholefield, G. F. Muntz.
Blackburn, W. Feilden, J. Hornby
Bodmin, Major Vivian, Earl of Leicester.
Bolton, P. Ainsworth, Dr. J. Bowring.
Boston, Sir J. Duke, J. S. Brownrigg.
Bradford, W. Bosfield, sen., J. Hardy.
Breconshire, Col. T. Wood.
Brecon, C. M. R. Morgan.
Bridgenorth, T. C. Whitmore, Sir Robert Pigot, Bart.
Bridgewater, H. Broadwood, T. S. Forman.
Bridport, A. D. Cockrane, T. A. Mitchell.
Brighton, Capt. Pechell, T. N. Wigney.
Bristol, P. J. Miles, Hon. F. Berkeley.
Buckinghamshire, Sir W. L. Young, Col. Geo. Du Pré, C. R. S. Murray.
Buckingham, Sir T. Fremantle, Sir J. Chetwode, Bart.
Bury, R. Walker.
Bury St. Edmunds, Lord Charles Fitzroy, Earl Jermyn.
Calne, Earl of Shelburn.
Cambridgeshire, E. T. Yorke, R. J. Eaton, P. Allix.
Cambridge University, Rt. Hon. H. Goulburn, Hon. C. E. Law
Cambridge, Sir Alex. Grant, Hon. J. H. Manners Sutton.
Canterbury, J. Bradshaw, Hon. G. P. S. Smythe.
Cardiff, &c., Dr. J. Nicholl.
Cardiganshire, Col. W. E. Powell.
Cardigan, &c., Pryse Pryse, J. S. Harford [double].

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Carlisle, P. H. Howard, W. Marshall.
Carmarthensh., Col. Rice Trevor, J. Jones.
Carmarthen, D. Morris.
Carnarvonshire, Hon. E. G. Pennant.
Carnarvon, W. B. Hughes.
Chatham, Rt. Hon. Capt. Byng.
Cheltenham, Captain C. F. Berkeley.
Cheshire (N.), W. T. Egerton, E. J. Stanley.
Cheshire (S.), Sir P. G. Egerton, J. Tollemache.
Chester, Lord R. Grosvenor, John Jervis.
Chichester, J. A. Smith, Lord Arthur Lennox.
Chippenham, Jos. Neeld, Rt. Hon. H. G. Boldero.
Christchurch, Sir George Rose.
Cirencester, W. Cripps, Colonel Master.
Clitheroe, M. Wilson.
Cockermouth, H. A. Aglionby, Edward Horsman.
Colchester, R. Sanderson, Sir G. H. Smyth.
Cornwall (E.), Lord Eliot, W. Rashleigh.
Cornwall (W.), E. W. W. Pendarves, Lord Boscawen-Rose.
Coventry, Rt. Hon. Edward Ellice, W. Williams.
Cricklade, John Neeld, Hon. H. Howard.
Cumberland (E.), Hon. C. Howard, W. James.
Cumberland (W.), E. Stanley, S. Irton.
Dartmouth, Sir John Seale, Bart.
Denbighshire, Hon. W. Bagot, Sir W. Wynn, Bart.
Denbigh, J. Mainwaring.
Derbyshire (N.), Hon. G. H. Cavendish, W. Evans.
Derbyshire (S.), E. M. Mundy, C. R. Colville.
Derby, Edward Strutt, Hon. J. B. Ponsonby.
Devizes, G. H. W. Heneage, T. H. S. Sotheron.
Devonport, Sir G. Grey, Bart., Henry Tuffnell.
Devonshire (N.), Will. Buck, Sir T. Dyke Acland.
Devonshire (S.), Sir J. Y. Buller, Bart., Lord Courtenay.
Dorchester, Hon. A. H. Cooper, Rt. Hon. Sir J. Graham.
Dorsetshire, Lord Ashley, H. C. Sturt, G. Bankes.
Dover, E. Rice, Sir J. R. Reid.
Droitwich, J. S. Pakington.
Dudley, T. Hawkes.
Durham (N.), H. Lambton, Hon. H. T. Liddell.
Durham (S.), Lord H. Vane, J. Bowes.
Durham City, T. C. Granger, R. Fitzroy.
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Surrey (West), W. J. Denison, J. Trotter.
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Sussex (West), Earl of March, C. Wyndham.
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Wakefield, Jos. Holdsworth.
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York, J. H. Lowther, H. R. Yorke.

SCOTLAND.

County Members, 30; Cities and Boroughs, 23—Total, 53.

Aberdeen, County, Hon. Captain Gordon.
Aberdeen, A. Bannerman.
Andrew's, St. Cupar, &c., E. Ellice, jun.
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Ayr, County, Lord Kelburne.
Ayr, &c., Lord James Stuart.
Banff, County, General Duff.
Berwick, County, Sir H. P. Campbell, Bt.
Bute, County, Rt. Hon. Sir W. Rae.
Caithness, County, G. Trail.
Clackmannan and Kinross, Hon. G. R. Abercrombie.
Dumbarton, County, A. Smollett.
Dumfries, County, J. J. H. Johnstone.
Dumfries, &c., W. Ewart.
Dundee, G. Duncan.
Edinburgh, County, W. R. Ramsay.
Edinburgh, Rt. Hon. T. B. Macaulay, W. G. Craig.
Elgin and Nairn Counties, C. L. C. Bruce.
Elgin, &c., Sir A. Leith Hay.
Falkirk, &c., W. D. Gillon.
Fife, County, Captain J. Wemyss.
Forfar, County, Lord J. F. Gordon.
Glasgow, J. Oswald, J. Dennistoun.
Greenock, R. Wallace.
Haddington, Co., Sir T. B. Hepburn, Bart.
Haddington, J. M. Balfour.
Inverness, County, Hon. Jas. Baillie.
Inverness, Boroughs, Jas. Morrison.
Kilmarnock, &c., J. C. Colquhoun.
Kincardine, County, Hon. H. Arbuthnot
Kirkaldy, &c., Robert Ferguson.
Kirkcudbright, Alex. Murray.
Lanark, County, M. Lockhart.
Leith, Rt. Hon. Andrew Rutherfurd.
Linlithgow, County, Hon. Cha. Hope.
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Orkney and Shetland, F. Dundas.
Paisley, A. Hastie.
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Perth, County, H. Home Drummond.
Perth, Rt. Hon. Fox Maule.
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Roxburgh, County, Hon F. Scott.
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Stirling, Lord Dalmeny.
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Wick, &c., J. Loch.
Wigton, County, Capt. J. Dalrymple.
Wigton, &c., J. M'Taggart.

IRELAND.

County Members, 64; Universities, 2; Cities and Boroughs, 39—Total, 105.

Antrim, County, J. Irving, N. Alexander.
Armagh, County, Viscount Acheson, Col. W. Verner.
Armagh, Lt. Col. Rawdon.
Athlone, G. de la Poer Beresford.
Bandonbridge, Serjeant Jackson.
Belfast, J. E. Tennent, W. G. Johnson.
Carlow, County, H. Bruen, T. Bunbury.
Carlow, B. V. Layard.
Carrickfergus, P. Kirk.
Cashel, Dr. Stock.
Cavan, County, J. Young, H. J. Clements.
Clare, County, Major M'Namara, C. O'Brien.
Clonmel, Rt. Hon. David Richard Pigot.
Coleraine, E. Litton.

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Cork, County, E. B. Roche, D. O'Connell.
Cork, F. S. Murphy, D. Callaghan.
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Downpatrick, D. Kerr.
Drogheda, Sir W. Somerville.
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Dublin, City, J. B. West, E. Grogan.
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Kerry, County, M. J. O'Connell, Hon. W. Browne.
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Kilkenny, County, Hon. P. Butler, G. Bryan.
Kilkenny, J. O'Connell.
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Londonderry, Sir R. A. Ferguson, Bart.
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Meath, Henry Grattan, Dan. O'Connell.
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Sligo, J. P. Somers.
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Tralee, Maurice O'Connell.
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Waterford, W. Christmas, W. M. Reade.
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Wexford, Sir Thos. Esmond, Bart.
Wicklow, County, Sir R. Howard, W. Atton.
Youghall, C. Cavendish.

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Lord Mayor, Right. Hon. John Pirie, Alderman for the Ward of Cornhill.

Aldermen who have served the Office of Lord Mayor.

	Elected		Elected
Bridge Without...	Sir C.S Hunter, Bt. 1804	Lime Street.....	C. Farebrother.....1826
Cripplegate.....	Sir M Wood, Bt... 1807	Bishopgate	W. T. Copeland.... 1829
Coleman Street	Sir W. Heygate, Bt. 1812	Farringdon Within,	T. Kelly 1830
Billingsgate.....	A. Brown 1821	Broad Street	Sir J. Cowan, Bart. 1830
Cheap...	W. Thompson..... 1821	Castle Baynard ...	S. Wilson..... 1831
Tower	M. P. Lucas..... 1821	Bridge Within	Sir Chapman Marshall 1832
Langbourne.....	Sir John Key, Bart. 1823		
Aldersgate	Sir Peter Laurie... 1826	Portsoken	Thomas Johnson... 1833

Aldermen who have not served the Office of Lord Mayor.

Cordwainers.....	T. Wood..... 1835	Dowgate	John Johnson 1839
Bread Street.....	J. Lainson..... 1835	Candlewick.....	Sir G. Carroll..... 1840
Aldgate.....	J. Humphery 1836	Farringdon Without.	Sir James Duke 1840
Vintry	W. Magnay 1838	Queenhithe	Hooper, J. K. 1840
Walbrook.....	Mich. Gibbs 1838	Bassishaw.....	Thomas Farncombe 1841

Sheriffs, Alderman Magnay, and Alexander Rogers, Esq.
Under Sheriffs, Messrs. Britten and T. Pritchard.

Recorder, Hon. C. E. Law.
Common Serjeant, J. Mirehouse, Esq.
Judge of Sheriffs' Court, Serjt. Arabin.
Chamberlain, Sir J. Shaw, Bart.

Town Clerk, H. Woodthorpe, Esq.
Solicitor, Chas. Pearson, Esq.
Commissioner of Police, D. W. Harvey, Esq.

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Governor, Sir John Henry Pelly, Bart.
Deputy-Governor, William Cotton, Esq.
Twenty-four other Directors.

Secretary, J. Knight, Esq.
Chief Cashier, M. Marshall, Esq.

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THE

MECHANICS' ALMANACK

AND

ENGINEERS' YEAR BOOK

FOR

1843:

CONTAINING

A COMPLETE CALENDAR AND EPHEMERIS FOR THE YEAR,
With Astronomical Memoranda for each Month;

CLASSIFIED LIST OF NEW PATENTS;

THE NEW COPYRIGHT OF DESIGNS ACT,
With Instructions for Registration, Table of Fees, &c.;

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State of Labour
In the Coal, Iron, Copper, Lead, and Zinc Mines and Works, with the Act for Abolition of Female and Infant Labour;

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BRITISH SAILING VESSELS AND STEAMERS; VELOCITIES OF STEAMERS;
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&c. &c. &c.

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Price One Shilling.

CHRONOLOGICAL CYCLES, &c.				ECCLESIASTICAL FEASTS.			
Dominical Letter	A	Solar Cycle - -	4	Shrove Sun.	Feb. 26	Holy Thursd.	May 25
Golden Number -	1	No. of Direction	26	Midlent Sun.	Mar. 26	Whit.-Sund.	June 4
Epact - - -	0	Julian Period	6556	Easter Day,	Apr. 16	Trinity Sund.	June 11
Sund. aft. Trinity -	24	Roman Indiction	1	Rogation Sun.	May 21	Advent Sund.	Dec. 3

ECLIPSES, &c., 1843.

Two of the Sun and *one* of the Moon.

I. *June* 27.—An *annular* Eclipse of the Sun, invisible in Great Britain.

II. *December* 6.—A *partial* and visible Eclipse of the Moon on the lower limb: magnitude, $2\frac{1}{3}$ digits. During the eclipse the Moon passes the meridian, and it begins in the evening of Dec. 6th, and ends on the following morning. The times of beginning, middle, and end, for several places, are exhibited in the following table:

	London.	Edinburgh.	Dublin.	Liverpool.	Newcastle.
	h m	h m	h m	h m	h m
Beginning	11 a 18	11 a 5	10 a 53	11 a 6	11 a 12
Greatest darkness	0 m 11	11 58	11 46	11 59	0 m 5
End	1 4	0 m 52	0 m 39	0 m 52	0 58

III. *December* 21.—A *total* Eclipse of the Sun, invisible in Great Britain.

Mercury may be seen in the evenings, near the western horizon, soon after sunsetting, about *Jan.* 29., *May* 24., and *Sept.* 20.; and in the mornings, shortly before sunrising, about *Mar.* 12., *July* 11., and *Oct.* 30.

*** For the other planets, see the astronomical memoranda, each month.

TABLE, showing the Illuminated Appearances of Venus and Mars.

Date.	Venus.	Mars.
Jan. 15	0·185	0·908
Feb 14	0·419	0·896
Mar. 15	0·572	0·897
Apr. 15	0·694	0·924
May 15	0·789	0·977
June 15	0·869	0·995
July 15	0·930	0·933
Aug. 15	0·974	0·874
Sept. 15	0·997	0·848
Oct. 15	0·998	0·847
Nov. 15	0·982	0·860
Dec. 15	0·953	0·879

The numbers given in this Table represent the versed sines of the illuminated portions of the Discs, the apparent Diameters of the Planets being considered as *unity*. These being traced and compared by observations on the planets with good telescopes, serve remarkably to confirm the truth of the solar system to young astronomers.

LAW TERMS for the YEAR 1843.

1. Hilary Term *begins* Jan. 11., *ends* Jan. 31.; and *contains* 21 days.
2. Easter Term *begins* April 15., *ends* May 11.; and *contains* 27 days.
3. Trinity Term *begins* May 25., *ends* June 15.; and *contains* 22 days.
4. Michaelmas Term *begins* Nov. 2., *ends* Nov. 25.; and *contains* 24 days.

*** By the stat. 1 Will. IV. cap. 3. sec. 2., it is enacted that all writs usually returnable before any of His Majesty's Courts of King's Bench, Common Pleas, and Exchequer respectively, on general Return Days, might, after the First day of *January*, 1831, be made returnable on the Third day exclusive before the commencement of each Term, or on any day, not being *Sunday*, between that day and the third day exclusive before the last day of the Term; and that the day for appearance should, as theretofore, be the Third day after the Return, exclusive of the Return day; or, in case such Third day should fall on a *Sunday*, then on the Fourth day after such Return, exclusive of the Return day. All other writs must, as before, be made returnable on a day in full Term.

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MOON'S QUARTERS.

☽ First Quarter, 8th day, at 8 h. 11 m. afternoon.
○ Full Moon, 16th day, at 8 h. 27 m. morning.
☾ Last Quarter, 23d day, at 1 h. 1 m. morning.
● New Moon, 30th day, at 0 h. 1 m. afternoon.

☉ enters ♒ 20th day, at 3 h. 31 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	3	43	23 S.	3
7	12	6	28	22	26
13	12	8	54	21	33
19	12	10	58	20	25
25	12	12	35	19	3

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VIII	III.								
1	Sun	Circumcision 1 Sun. aft.	9	59	8	m 37	4	a 52	2	9	2	30
2	M	[Christ.	8	IV.	9	5	6	5	2	50	3	10
3	Tu	Saturn rises 8 21 morn.	8	1	9	25	7	18	3	30	3	48
4	W	Jupiter sets 5 26 aft.	8	2	9	43	8	27	4	4	4	20
5	Th		8	4	9	59	9	36	4	36	4	53
6	F	Epiphany. 12th Day.	7	5	10	13	10	44	5	11	5	29
7	S		7	6	10	28	11	51	5	48	6	7
8	Sun	1 Sun. aft. Epiph. Lucian.	7	7	10	42	morn.		6	28	6	50
9	M	Plough Monday	6	8	10	59	1	0	7	13	7	37
10	Tu		6	10	11	20	2	10	8	5	8	35
11	W	Hilary Term begins	5	11	11	48	3	20	9	6	9	37
12	Th		5	13	0	a 25	4	29	10	9	10	42
13	F	Hil. Cam. T. begins	4	14	1	13	5	35	11	17	11	52
14	S	Oxford Term begins	3	15	2	16	6	31	—	—	0	23
15	Sun	2 Sun. aft. Epiph.	2	17	3	30	7	17	0	53	1	22
16	M		1	19	4	53	7	52	1	49	2	14
17	Tu	Mars rises 2 3 morn.	0	20	6	18	8	20	2	37	2	58
18	W	Prisca	VII	22	7	44	8	42	3	18	3	37
19	Th		58	24	9	9	9	2	3	56	4	15
20	F	Fabian	57	25	10	34	9	21	4	34	4	54
21	S	Agnes	56	27	11	59	9	39	5	15	5	36
22	Sun	3 Sun. aft. Epiph. Vinc.	55	28	morn.		10	0	5	58	6	24
23	M		54	30	1	22	10	24	6	53	7	26
24	Tu	Venus rises 4 53 morn.	53	32	2	42	10	55	8	1	8	39
25	W	Convers. of St. Paul	52	34	3	58	11	35	9	17	9	54
26	Th		50	36	5	4	0	a 26	10	30	11	4
27	F	Duke of Sussex born	48	38	5	56	1	27	11	36	—	—
28	S	Mercury sets 6 19 aft.	47	39	6	37	2	35	0	6	0	34
29	Sun	4 Sun. aft. Epiph.	46	41	7	7	3	49	1	0	1	23
30	M	K. Char. I. mart. 1649.	45	43	7	30	5	2	1	45	2	5
31	Tu	Hilary Term ends	43	45	7	49	6	12	2	24	2	42

ASTRONOMICAL MEMORANDA.

2d day, Jupiter in conjunction with the Moon.
7th — Saturn in conjunction with the Sun.
25th — Jupiter in conjunction with the Sun.
26th — Venus in conjunction with the Moon.
28th — Saturn in conjunction with the Moon.
30th — Jupiter in conjunction with the Moon.

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MOON'S QUARTERS.

☽ First Quarter, 7th day, at 4 h. 32 m. afternoon.
○ Full Moon, 14th day, at 8 h. 10 m. afternoon.
☾ Last Quarter, 21st day, at 10 h. 46 m. morning.

☉ enters ♓ 19th day, at 6 h. 9 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	13	53	17 S.	12
7	12	14	27	15	25
13	12	14	32	13	28
19	12	14	10	11	24
25	12	13	24	9	13

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VII	IV								
1	W		42	46	8 m	5	7 a	21	2	59	3	15
2	Th	Purif. Cand. Day	40	48	8	20	8	29	3	31	3	47
3	F	Blaise	38	50	8	34	9	36	4	3	4	19
4	S		36	52	8	50	10	44	4	36	4	53
5	Sun	5 Sun aft. Epiph. Agatha	34	54	9	6	11	52	5	12	5	32
6	M		33	55	9	25	morn.		5	53	6	16
7	Tu	Saturn rises 6 16 morn.	31	57	9	49	1	1	6	40	7	5
8	W	Jupiter rises 7 8 morn.	30	59	10	20	2	10	7	31	8	0
9	Th		29	v	11	2	3	16	8	32	9	5
10	F	Queen Vict. married	27	3	11	55	4	16	9	40	10	15
11	S		25	5	1 a	3	5	6	10	51	11	26
12	Sun	Septuagesima Sunday	23	7	2	21	5	46	—	—	0	0
13	M		21	9	3	45	6	18	0	32	1	1
14	Tu	Valentine	20	10	5	12	6	44	1	28	1	53
15	W		18	12	6	41	7	5	2	16	2	38
16	Th	Mars rises 1 34 morn.	15	13	8	8	7	25	2	58	3	17
17	F	Venus rises 4 42 morn.	13	15	9	35	7	44	3	35	3	55
18	S	Mercury rises 6 31 morn.	11	17	11	3	8	4	4	15	4	36
19	Sun	Sexagesima Sunday.	9	19	morn.		8	28	4	59	5	23
20	M		7	21	0	27	8	58	5	48	6	15
21	Tu	Saturn rises 5 26 morn.	5	23	1	46	9	35	6	45	7	18
22	W	Jupiter rises 6 20 morn.	3	25	2	56	10	23	7	53	8	29
23	Th	Mars rises 1 25 morn.	1	27	3	53	11	21	9	4	9	37
24	F	St. Matth. D. Cam. b.	VI	29	4	37	0 a	28	10	9	10	39
25	S		57	30	5	10	1	39	11	8	11	36
26	Sun	Shrove Sunday	55	32	5	35	2	50	—	—	0	3
27	M	Venus rises 4 41 morn.	52	34	5	56	4	0	0	28	0	51
28	Tu	Shrove Tuesday	50	36	6	13	5	9	1	12	1	32

ASTRONOMICAL MEMORANDA.

1st day, Mercury in conj. with ☽
14th — Mercury in conj. with ☉
16th — Mars in quadrature with ☉
21st — Mars in conj. with ☽
25th day, Venus & Sat. in conj. with ☽
26th — Jupiter in conj. with ☽
27th — Mercury in conj. with ☽
28th — Venus in conj. with Saturn.

Jupiter will be an *Evening Star* until January 25th; then a *Morning Star* until August 16th; and afterwards an *Evening Star* to the end of the year.
Venus will be a *Morning Star* until September 30th, then an *Evening Star* for the remainder of the year.

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MOON'S QUARTERS.

● New Moon, 1st day, at 6 h. 3 m. morning.
☽ First Quarter, 9th day, at 9 h. 49 m. morning.
○ Full Moon, 16th day, at 5 h. 59 m. morning.
☾ Last Quarter, 22d day, at 10 h. 34 m. afternoon.
● New Moon, 30th day, at 11 h. 49 m. afternoon.

☉ enters ♈ 21st day, at 6 h. 6 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	12	42	7 S.	43
7	12	11	23	5	24
13	12	9	49	3	4
19	12	8	5	0 S.	42
25	12	6	15	1 N.	40

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	V								
1	W	LENT BEGINS ASH WED.	48	37	6m	27	6 a	17	1	51	2	9
2	Th	Chad [David	46	39	6	42	7	25	2	26	2	43
3	F	Saturn rises 4 50 morn.	44	40	6	57	8	32	2	59	3	14
4	S		42	42	7	13	9	40	3	30	3	47
5	Sun	1 SUNDAY IN LENT	40	44	7	31	10	48	4	5	4	23
6	M		37	46	7	54	11	56	4	43	5	4
7	Tu	Perpetua	35	47	8	21	morn.		5	26	5	50
8	W	EMBER WEEK	33	49	8	58	1	2	6	14	6	40
9	Th		31	51	9	44	2	2	7	7	7	36
10	F	Jupiter rises 5 26 morn.	29	53	10	43	2	55	8	7	8	40
11	S	Mars rises 1 2 morn.	26	54	11	55	3	39	9	13	9	48
12	Sun	2 SUNDAY IN LENT. GRE-	24	56	1 a	15	4	13	10	24	11	1
13	M	[GORY	22	58	2	40	4	42	11	37	—	—
14	Tu	Venus rises 4 36 morn.	20	VI	4	6	5	5	0	10	0	39
15	W	Mercury rises 5 35 morn.	17	1	5	33	5	26	1	6	1	30
16	Th		15	3	7	2	5	47	1	53	2	15
17	F	St. Patrick	12	5	8	32	6	8	2	36	2	56
18	S	Edw. K. W. Saxons	10	6	10	1	6	31	3	16	3	37
19	Sun	3 SUNDAY IN LENT	8	8	11	26	6	59	3	58	4	21
20	M		6	10	morn.		7	33	4	45	5	11
21	Tu	Benedict	3	11	0	41	8	19	5	39	6	7
22	W	Saturn rises 3 40 morn.	1	13	1	45	9	15	6	36	7	7
23	Th	Jupiter rises 4 41 morn.	v	15	2	33	10	20	7	40	8	12
24	F		57	17	3	12	11	30	8	43	9	12
25	S	ANNUNC. OR LADY-DAY	54	18	3	39	0 a	41	9	39	10	6
26	Sun	4TH, OR MIDLENT SUN.	52	20	4	1	1	52	10	33	11	0
27	M		50	22	4	19	3	1	11	26	11	50
28	Tu	Mars rises 0 32 morn.	47	23	4	36	4	9	—	—	0	13
29	W	Venus rises 4 24 morn.	45	25	4	50	5	16	0	34	0	54
30	Th	Mercury rises 5 20 morn.	43	27	5	5	6	22	1	14	1	33
31	F		40	28	5	20	7	29	1	51	2	9

ASTRONOMICAL MEMORANDA.

21st day, Spring commences; Mars in conjunction with the Moon.
24th — Venus in conjunction with Jupiter; Saturn in conjunction with the Moon.
26th — Jupiter and Venus in conjunction with the Moon.
28th — Mercury in conjunction with the Moon.

[PRINTED FOR THE COMPANY OF STATIONERS.] A 3

MOON'S QUARTERS.

☽ First Quarter, 7th day, at 11 h. 6 m. afternoon.
○ Full Moon, 14th day, at 2 h. 29 m. afternoon.
☾ Last Quarter, 21st day, at 0 h. 25 m. afternoon.
● New Moon, 29th day, at 4 h. 19 m. afternoon.

☉ enters ♉ 20th day, at 6 h. 16 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	4	7	4 N.	24
7	12	2	20	6	42
13	12	0	40	8	55
19	11	59	11	11	3
25	11	57	58	13	4

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises.	Sets.	High Water, London Bridge. Morn.	Aftern.
			V	VI	h m	h m	h m	h m
1	S		38	30	5 m 38	8 a 37	2 27	2 45
2	Sun	5 Sunday in Lent	36	32	5 59	9 44	3 3	3 21
3	M	Rich. Bp. of Chich.	34	34	6 26	10 52	3 40	4 0
4	Tu	Saturn rises 2 52 morn.	31	35	7 0	11 53	4 20	4 41
5	W		29	37	7 43	morn.	5 4	5 28
6	Th	Old Lady Day	27	38	8 36	0 48	5 53	6 18
7	F	Cambridge Term ends	25	40	9 41	1 33	6 44	7 10
8	S	Oxford Term ends	23	41	10 53	2 10	7 37	8 7
9	Sun	Palm Sunday.	21	43	0 a 13	2 41	8 40	9 16
10	M	Jupiter rises 3 38 morn.	19	44	1 36	3 5	9 54	10 32
11	Tu	Mars rises 11 56 aft.	16	46	3 1	3 26	11 9	11 44
12	W		14	48	4 27	3 47	— —	0 15
13	Th	Maundy Thursday	12	50	5 55	4 6	0 42	1 7
14	F	Good Friday.	9	51	7 26	4 28	1 30	1 53
15	S	Easter Term begins	7	53	8 54	4 55	2 15	2 37
16	Sun	Easter Day	5	55	10 18	5 28	2 59	3 21
17	M	Easter Monday	3	57	11 28	6 10	3 44	4 8
18	Tu	Easter Tuesday	1	58	morn.	7 3	4 32	4 57
19	W	Alphege	iv	59	0 25	8 8	5 23	5 49
20	Th		57	vii	1 8	9 18	6 15	6 42
21	F	Venus rises 3 51 morn.	55	3	1 41	10 31	7 9	7 36
22	S	[George	53	5	2 5	11 43	8 4	8 32
23	Sun	1st, or Low Sunday. St.	51	6	2 25	0 a 53	9 0	9 26
24	M	Mercury rises 4 50 morn.	49	8	2 41	2 0	9 52	10 17
25	Tu	St. Mark. Ds. Gloc. bo.	47	9	2 57	3 6	10 42	11 7
26	W	Oxf. and Camb. T. beg.	45	11	3 12	4 13	11 31	11 54
27	Th		43	13	3 27	5 20	— —	0 16
28	F		41	14	3 45	6 28	0 37	0 58
29	S		39	16	4 4	7 36	1 19	1 39
30	Sun	2 Sun. aft. Easter	37	18	4 28	8 43	1 59	2 20

ASTRONOMICAL MEMORANDA.

16th day, Saturn in quadrature with the Sun.
18th — Mars in conjunction with the Moon.
20th — Saturn in conjunction with the Moon.
23d — Jupiter in conjunction with the Moon.
25th — Mercury in superior conjunction with the Sun.
26th — Venus in conjunction with the Moon.
30th — Mercury in conjunction with the Moon.

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MOON'S QUARTERS.

☽ First Quarter, 7th day, at 8 h. 24 m. morning.
○ Full Moon, 13th day, at 10 h. 34 m. afternoon.
☾ Last Quarter, 21st day, at 3 h. 54 m. morning.
● New Moon, 29th day, at 6 h. 55 m. morning.

⊙ enters ♊ 21st day, at 6 h. 27 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	57	2	14 N.	58
7	11	56	25	16	43
13	11	56	7	18	18
19	11	56	11	19	41
25	11	56	34	20	53

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			IV	VII								
1	M	St. Phil. and St. James	35	20	5	m 2	9	a 47	2	41	3	2
2	Tu		33	21	5	42	10	44	3	22	3	43
3	W	Inven. of the Cross	31	23	6	33	11	32	4	4	4	25
4	Th	Saturn rises 0 56 morn.	30	24	7	34	morn.		4	46	5	8
5	F		28	26	8	43	0	11	5	30	5	53
6	S	Jn. Evan. à P. Lat.	26	27	9	59	0	42	6	16	6	40
7	Sun	3 Sun. aft. Easter	24	28	11	18	1	7	7	5	7	32
8	M		22	30	0	a 38	1	29	8	4	8	38
9	Tu	Jupiter rises 1 53 morn.	20	32	2	1	1	50	9	15	9	54
10	W		19	33	3	25	2	9	10	33	11	10
11	Th	Easter Term ends	17	35	4	53	2	29	11	44	—	—
12	F		16	36	6	21	2	53	0	16	0	44
13	S	Old May Day	14	38	7	47	3	22	1	10	1	35
14	Sun	4 Sun. aft. Easter	12	40	9	4	3	59	1	59	2	23
15	M		10	42	10	11	4	47	2	46	3	9
16	Tu	Mars rises 9 57 aft.	9	43	11	1	5	49	3	32	3	55
17	W	Venus rises 3 5 morn.	7	45	11	38	6	58	4	17	4	40
18	Th		6	46	morn.		8	13	5	2	5	24
19	F	Dunstan	5	47	0	7	9	27	5	45	6	7
20	S		4	48	0	28	10	38	6	29	6	51
21	Sun	5th or Rogation Sun.	2	50	0	46	11	48	7	14	7	39
22	M		1	51	1	2	0	a 55	8	5	8	31
23	Tu	Mercury sets 10 3 aft.	0	53	1	17	2	1	8	58	9	25
24	W	Queen Victoria born	III	54	1	34	3	8	9	52	10	19
25	Th	Asc. Holy Th. T.T. beg.	58	56	1	50	4	16	10	45	11	11
26	F	Aug. 1st Abp. of Cant.	57	57	2	9	5	24	11	37	—	—
27	S	Venerable Bede	56	58	2	33	6	33	0	2	0	26
28	Sun	Sun. aft. Ascension	55	59	3	2	7	38	0	50	1	14
29	M	K. Ch. II. Rest. 1660	54	VIII	3	39	8	38	1	37	2	0
30	Tu		53	1	4	28	9	29	2	23	2	45
31	W		52	2	5	28	10	12	3	6	3	27

ASTRONOMICAL MEMORANDA.

15th day, Mars in conjunction with the Moon.
17th — Jupiter in quadrature with the Sun.
18th — Saturn in conjunction with the Moon.
20th — Jupiter in conjunction with the Moon.
26th — Venus in conjunction with the Moon.
31st — Mercury in conjunction with the Moon.

MOON'S QUARTERS.

☽ First Quarter, 5th day, at 2 h. 35 m. afternoon.
○ Full Moon, 12th day, at 7 h. 11 m. morning.
☾ Last Quarter, 19th day, at 8 h. 30 m. afternoon.
● New Moon, 27th day, at 7 h. 20 m. afternoon.

☉ enters ♋ 22d day, at 3 h. 3 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′	
1	11	57	25	22	N.	1
7	11	58	24	22		44
13	11	59	34	23		12
19	12	0	50	23		26
25	12	2	8	23		25

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	MOON Rises. m	MOON Sets. h	MOON Sets. m	High Water, London Bridge. Morn. h	Morn. m	Aftern. h	Aftern. m
			III	VIII								
1	Th	Nicomede	51	4	6	m 35	10	a 46	3	48	4	8
2	F	Saturn rises 10 57 aft.	51	5	7	49	11	13	4	28	4	48
3	S	Oxford Term ends	50	6	9	7	11	36	5	7	5	27
4	Sun	Whit-Sunday	49	7	10	27	11	54	5	47	6	8
5	M	Whit-Mond. K. of H. b.	48	8	11	47	morn.		6	31	6	56
6	Tu	Whit-Tuesday	48	9	1	a 7	0	13	7	23	7	55
7	W	Ember W. Oxf. T. beg.	47	9	2	31	0	33	8	33	9	15
8	Th		47	10	3	55	0	55	9	59	10	42
9	F	Jupiter rises 11 57 aft.	47	11	5	20	1	20	11	20	11	54
10	S		46	12	6	41	1	52	—	—	0	25
11	Sun	Trin. Sun. St. Barnabas	45	13	7	52	2	34	0	53	1	20
12	M		45	14	8	50	3	29	1	46	2	10
13	Tu	Mars sets 3 1 morn.	45	15	9	33	4	36	2	33	2	55
14	W		45	15	10	6	5	50	3	16	3	36
15	Th	Corp. Christi T. T. ends	45	15	10	30	7	5	3	56	4	15
16	F		44	16	10	50	8	20	4	34	4	53
17	S	St. Alban	44	16	11	7	9	31	5	11	5	29
18	Sun	1 Sun. aft. Trin.	44	17	11	23	10	40	5	48	6	7
19	M		44	17	11	39	11	48	6	26	6	47
20	Tu	Queen Victoria acc.	44	18	11	55	0	a 55	7	10	7	34
21	W	Qu. Vict. proc. L. Day	44	18	morn.		2	2	7	59	8	28
22	Th		45	18	0	13	3	10	8	58	9	28
23	F	Venus rises 2 15 morn.	45	18	0	35	4	18	9	59	10	30
24	S	Nat. J. Bapt. Mids. Day	46	18	1	1	5	24	11	0	11	30
25	Sun	2 Sun. aft. Trinity	46	18	1	35	6	27	—	—	0	0
26	M		46	18	2	20	7	23	0	28	0	54
27	Tu		47	18	3	16	8	9	1	20	1	45
28	W	Queen Victoria Cor.	47	18	4	22	8	48	2	9	2	32
29	Th	St. Peter	48	18	5	36	9	17	2	53	3	13
30	F	Mercury rises 3 14 morn.	48	18	6	54	9	40	3	32	3	51

ASTRONOMICAL MEMORANDA.

6th day, Mars in opposition to the Sun.
11th — Mars in conjunction with the Moon.
14th — Saturn in conjunction with the Moon.
17th — Jupiter in conjunction with the Moon.
19th — Mercury in inferior conjunction with the Sun.
22d — Summer commences.
25th — Venus in conjunction with the Moon.
26th — Mercury in conjunction with the Moon.

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MOON'S QUARTERS.

☽ First Quarter, 4th day, at 7 h. 3 m. afternoon.
○ Full Moon, 11th day, at 5 h. 6 m. afternoon.
☾ Last Quarter, 19th day, at 1 h. 40 m. afternoon.
● New Moon, 27th day, at 5 h. 42 m. morning.

☉ enters ♌ 23d day, at 1 h. 58 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	3	22	23 N.	9
7	12	4	27	22	39
13	12	5	19	21	55
19	12	5	54	20	57
25	12	6	10	19	46

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			III	VIII								
1	S	Saturn rises 8 58 aft.	49	18	8 m	14	10 a	1	4	10	4	29
2	Sun	3 Sun. aft. Trin. Visit.	49	18	9	36	10	21	4	47	5	6
3	M	Dog D. beg. [B. V. M.	50	17	10	56	10	40	5	26	5	47
4	Tu	Trans. of St. Martin	51	17	0 a	17	11	0	6	10	6	36
5	W		52	17	1	40	11	23	7	3	7	33
6	Th	Old Midsummer Day	52	16	3	3	11	53	8	10	8	51
7	F	Th. à Becket. C. T. ends	53	16	4	24	morn.		9	33	10	16
8	S	Oxford Term ends	54	15	5	37	0	29	10	57	11	34
9	Sun	4 Sun. aft. Trinity	55	14	6	38	1	17	—	—	0	5
10	M		56	14	7	27	2	18	0	34	1	2
11	Tu	Jupiter rises 9 47 aft.	57	13	8	4	3	28	1	29	1	53
12	W	Mars sets 0 41 morn.	58	12	8	33	4	48	2	15	2	36
13	Th	Venus rises 2 18 morn.	59	11	8	54	5	59	2	56	3	14
14	F	Mercury rises 2 36 morn.	iv	10	9	13	7	12	3	31	3	47
15	S	St. Swithin	2	10	9	28	8	23	4	3	4	20
16	Sun	5 Sun. aft. Trinity	3	9	9	44	9	31	4	37	4	54
17	M		4	8	10	0	10	39	5	12	5	30
18	Tu	Saturn rises 7 46 aft.	5	7	10	18	11	48	5	49	6	9
19	W	Jupiter rises 9 14 aft.	6	6	10	38	0 a	55	6	30	6	52
20	Th	Margaret	7	5	11	2	2	2	7	17	7	45
21	F		9	3	11	32	3	8	8	15	8	46
22	S	Magdalene	10	2	morn.		4	13	9	18	9	51
23	Sun	6 Sun. aft. Trinity	12	0	0	12	5	12	10	24	10	58
24	M	Mars sets 11 54 aft.	13	vii	1	2	6	3	11	31	—	—
25	Tu	St. Jas. Ds. Camb. b.	14	58	2	4	6	44	0	2	0	32
26	W	St. Anne	16	56	3	16	7	17	1	0	1	27
27	Th		17	55	4	35	7	44	1	52	2	15
28	F	Venus rises 2 42 morn.	18	54	5	55	8	6	2	36	2	56
29	S		20	52	7	18	8	27	3	16	3	35
30	Sun	7 Sun. aft. Trinity	22	50	8	40	8	47	3	53	4	11
31	M		23	49	10	3	9	7	4	30	4	49

ASTRONOMICAL MEMORANDA.

1st day, Sun in Apogee.
8th — Mars in conjunction with the Moon.
12th — Saturn in conjunction with the Moon.
14th — Jupiter in conjunction with the Moon.
15th — Saturn in opposition to the Sun.
25th — Venus in conjunction with the Moon.
26th — Mercury in conjunction with the Moon.

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MOON'S QUARTERS.

☽ First Quarter, 2d day, at 11 h. 27 m. afternoon.
○ Full Moon, 10th day, at 4 h. 54 m. morning.
☾ Last Quarter, 18th day, at 6 h. 50 m. morning.
● New Moon, 25th day, at 2 h. 35 m. afternoon.

⊙ enters ♍ 23d day, at 8 h. 29 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	6	3	18 N.	9
7	12	5	33	16	34
13	12	4	41	14	49
19	12	3	30	12	56
25	12	2	2	10	55

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			IV	VII								
1	Tu	Lammas Day	25	47	11m	28	9 a	29	5	9	5	30
2	W	Saturn sets 2 56 morn.	27	45	0 a	51	9	56	5	55	6	22
3	Th	Jupiter rises 8 11 aft.	28	44	2	12	10	30	6	51	7	23
4	F	Mars sets 11 19 aft.	30	42	3	26	11	14	8	1	8	42
5	S		31	41	4	31	morn.		9	22	10	1
6	Sun	8 Sun. aft. Trin. Trans.	32	39	5	23	0	9	10	38	11	13
7	M	Name of Jesus	34	38	6	4	1	14	11	45	—	—
8	Tu	Venus rises 3 8 morn.	35	36	6	34	2	26	0	16	0	42
9	W		37	34	6	58	3	40	1	5	1	28
10	Th	St. Lawrence	38	32	7	18	4	54	1	50	2	10
11	F	Dog Days end	40	30	7	36	6	6	2	28	2	45
12	S	[Dow. b.	41	29	7	52	7	16	3	2	3	18
13	Sun	9 Sun. aft. Trinity. Qu.	43	27	8	7	8	24	3	34	3	50
14	M	Mercury sets 7 49 aft.	45	25	8	24	9	32	4	6	4	22
15	Tu	Assumption B. V. M.	46	23	8	42	10	39	4	39	4	57
16	W	Saturn sets 1 56 morn.	48	21	9	5	11	46	5	17	5	38
17	Th	Duchess of Kent b.	49	19	9	33	0 a	53	6	0	6	24
18	F		51	17	10	7	1	58	6	50	7	17
19	S	Jupiter rises 7 4 aft.	53	15	10	53	2	59	7	45	8	16
20	Sun	10 Sun. aft. Trinity	54	13	11	49	3	52	8	48	9	21
21	M		56	11	morn.		4	37	9	54	10	28
22	Tu	Mars sets 10 33 aft.	57	9	0	55	5	14	11	3	11	37
23	W	Venus rises 3 53 morn.	59	7	2	8	5	44	—	—	0	9
24	Th	St. Bartholomew	v	4	3	28	6	8	0	37	1	4
25	F		2	2	4	52	6	30	1	30	1	54
26	S	Prince Albert born	4	0	6	16	6	51	2	16	2	37
27	Sun	11 Sun. aft. Trinity	5	vi	7	41	7	12	2	56	3	14
28	M	St. Augustine	7	55	9	7	7	34	3	32	3	51
29	Tu	St. John Baptist beh.	9	53	10	34	8	0	4	11	4	33
30	W		11	51	11	57	8	33	4	56	5	21
31	Th		12	49	1 a	16	9	13	5	47	6	15

ASTRONOMICAL MEMORANDA.

5th day, Mars in conjunction with the Moon.
7th — Mercury in superior conjunction with the Sun.
8th — Saturn in conjunction with the Moon.
10th — Jupiter in conjunction with the Moon.
16th — Jupiter in opposition to the Sun.
24th — Venus in conjunction with the Moon.
26th — Mercury in conjunction with the Moon.

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MOON'S QUARTERS.

☽ First Quarter, 1st day, at 5 h. 22 m. morning.
○ Full Moon, 8th day, at 6 h. 57 m. afternoon.
☾ Last Quarter, 16th day, at 11 h. 13 m. afternoon.
● New Moon, 23d day, at 10 h. 53 m. afternoon.
☽ First Quarter, 30th day, at 2 h. 11 m. afternoon.

☉ enters ♎ 23d day, at 5 h. 10 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	0	0	8 N.	27
7	11	58	4	6	14
13	11	56	0	3	57
19	11	53	53	1 N.	39
25	11	51	48	0 S.	42

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			V	VI								
1	F	Giles	13	47	2 a	24	10 a	5	6	46	7	20
2	S	London burnt, 1666, O.S.	15	45	3	20	11	7	7	56	8	32
3	Sun	12 Sun. aft. Trinity	16	42	4	4	morn.		9	7	9	41
4	M	Saturn sets 0 36 morn.	18	40	4	36	0	16	10	15	10	47
5	Tu	Old Bartholomew	20	38	5	3	1	29	11	18	11	46
6	W		21	35	5	24	2	42	—	—	0	12
7	Th	Enurchus	23	33	5	42	3	53	0	35	0	57
8	F	Nativity B.V.M.	25	31	5	58	5	3	1	18	1	37
9	S	Jupiter sets 3 0 morn.	26	28	6	15	6	12	1	54	2	12
10	Sun	13 Sun. aft. Trinity	28	26	6	31	7	19	2	29	2	46
11	M		29	24	6	49	8	26	3	3	3	20
12	Tu	Mars sets 9 55 aft.	30	22	7	10	9	33	3	37	3	54
13	W	Venus rises 4 59 morn.	32	20	7	35	10	39	4	12	4	31
14	Th	Holy Cross	34	18	8	6	11	45	4	51	5	13
15	F		35	15	8	47	0 a	46	5	36	6	0
16	S	Mercury sets 6 43 aft.	37	13	9	37	1	42	6	25	6	51
17	Sun	14 Sun. aft. Trinity	39	11	10	36	2	29	7	18	7	46
18	M	Geo. I. and II. landed	40	8	11	45	3	8	8	16	8	48
19	Tu	Saturn sets 11 32 aft.	42	6	morn.		3	41	9	21	9	54
20	W	Ember Week	44	4	1	1	4	8	10	28	11	3
21	Th	St. Matthew	45	1	2	23	4	31	11	37	—	—
22	F		47	v	3	46	4	52	0	9	0	38
23	S	Jupiter sets 1 58 morn.	48	57	5	11	5	14	1	5	1	30
24	Sun	15 Sun. aft. Trinity	50	54	6	37	5	36	1	52	2	13
25	M	Mars sets 9 40 aft.	52	52	8	6	6	1	2	34	2	55
26	Tu	St. Cyprian	53	50	9	34	6	32	3	16	3	38
27	W		54	48	10	57	7	10	4	1	4	24
28	Th	Venus rises 5 45 morn.	56	46	0 a	12	8	0	4	48	5	14
29	F	St. Michael. Michael-	57	43	1	14	9	1	5	41	6	10
30	S	St. Jerome [mas Day	59	41	2	3	10	9	6	39	7	9

ASTRONOMICAL MEMORANDA.

2d — Mars in conjunction with the Moon.
4th — Saturn in conjunction with the Moon.
6th — Jupiter in conjunction with the Moon.
23d — Autumn commences; Venus in conjunction with the Moon.
25th — Mercury in conjunction with the Moon.
30th — Mars in conjunction with the Moon.

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MOON'S QUARTERS.

○ Full Moon, 8th day, at 11 h. 16 m. morning.
☾ Last Quarter, 16th day, at 1 h. 59 m. afternoon.
● New Moon, 23d day, at 7 h. 36 m. morning.
☽ First Quarter, 30th day, at 2 h. 43 m. morning.

☉ enters ♎ 24th day, at 1 h. 24 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	49	49	3 S.	2
7	11	47	59	5	21
13	11	46	24	7	38
19	11	45	8	9	51
25	11	44	14	11	59

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	V								
1	Sun	16 Sun. aft. Trinity	1	38	2 a	40	11 a	21	7	40	8	11
2	M	Saturn sets 10 41 aft.	3	36	3	8	morn.		8	43	9	15
3	Tu	Jupiter sets 1 16 morn.	5	34	3	30	0	33	9	46	10	15
4	W	Mars sets 9 35 aft.	7	31	3	48	1	45	10	42	11	8
5	Th		9	29	4	4	2	54	11	34	11	58
6	F	Faith	10	27	4	21	4	1	—	—	0	20
7	S	Venus sets 5 35 aft.	12	24	4	38	5	9	0	40	1	0
8	Sun	17 Sun. aft. Trinity	14	22	4	56	6	16	1	19	1	38
9	M	St. Denys	15	20	5	16	7	23	1	56	2	14
10	Tu	Oxf. & Cam. Terms beg.	17	18	5	39	8	29	2	33	2	51
11	W	Old Michaelmas Day	18	16	6	9	9	35	3	10	3	29
12	Th		20	14	6	47	10	37	3	49	4	9
13	F	Trans. K. Edw. Conf.	21	12	7	32	11	34	4	29	4	50
14	S		23	9	8	28	0 a	23	5	13	5	37
15	Sun	18 Sun. aft. Trinity	25	7	9	31	1	5	6	2	6	27
16	M		27	5	10	42	1	39	6	52	7	17
17	Tu	Etheldreda	29	3	11	58	2	7	7	44	8	13
18	W	St. Luke	30	1	morn.		2	30	8	44	9	17
19	Th	Mercury rises 5 49 morn.	31	IV	1	17	2	52	9	52	10	29
20	F		33	57	2	38	3	13	11	5	11	39
21	S	Saturn sets 9 29 aft.	35	55	4	2	3	35	—	—	0	10
22	Sun	19 Sun. aft. Trinity	37	53	5	30	3	58	0	39	1	5
23	M		38	51	6	59	4	27	1	29	1	53
24	Tu	Jupiter sets 11 50 aft.	40	48	8	26	5	4	2	17	2	40
25	W	Crispin	42	46	9	48	5	49	3	3	3	26
26	Th		44	44	10	59	6	47	3	49	4	13
27	F	Mars sets 9 30 aft.	46	42	11	55	7	55	4	38	5	3
28	S	St. Simon and St. Jude	48	40	0 a	37	9	8	5	28	5	53
29	Sun	20 Sun. aft. Trinity	50	38	1	8	10	22	6	18	6	43
30	M		52	36	1	33	11	34	7	10	7	37
31	Tu	Venus sets 4 55 aft.	53	35	1	53	morn.		8	5	8	34

ASTRONOMICAL MEMORANDA.

1st day, Saturn in conj. with ☽
2d — Venus in superior conj. with ☉
3d — Jupiter in conj. with ☽
5th — Mars in quadrature with ☉
13th — Saturn in quad. with ☉; Mercury in conj. with ☿
15th day, Mercury in inf. con. with ☉
17th — Mars in conj. with ♄
22d — Mercury in conj with ☽
23d — Venus in conj. with ☽
28th — Saturn in conj. with ♄
29th — Mars in conj. with ☽
31st — Jupiter in conj. with ☽

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MOON'S QUARTERS.

☽ Full Moon, 7th day, at 5 h. 22 m. morning.
☾ Last Quarter, 15th day, at 2 h. 33 m. morning.
● New Moon, 21st day, at 5 h. 34 m. afternoon.
☽ First Quarter, 28th day, at 7 h. 8 m. afternoon.

☉ enters ♐ 22d day, at 10 h. 2 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	43	44	14 S.	20
7	11	43	48	16	11
13	11	44	23	17	53
19	11	45	28	19	24
25	11	47	4	20	42

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	IV								
1	W	All Saints	55	33	2 a	10	0m	46	9	2	9	29
2	Th	All Souls. Mich. T. beg.	57	31	2	28	1	54	9	56	10	23
3	F	Princess Sophia born	59	29	2	45	3	1	10	49	11	15
4	S	K. William III. landed	VII	27	3	2	4	8	11	39	—	—
5	Sun	21 Sun. aft. T. Gunp. Pl.	2	26	3	22	5	14	0	2	0	24
6	M	Leonard	4	24	3	45	6	20	0	45	1	6
7	Tu		5	23	4	12	7	27	1	26	1	46
8	W	Saturn sets 8 24 aft.	7	21	4	47	8	30	2	7	2	28
9	Th	Pr. Wales b. 1841 L. M.	9	19	5	31	9	29	2	49	3	10
10	F	[Day	10	18	6	22	10	20	3	30	3	50
11	S	St. Martin	12	16	7	23	11	4	4	10	4	31
12	Sun	22 Sun. aft. Trin.	14	15	8	31	11	40	4	52	5	14
13	M	Britius	15	13	9	43	0 a	9	5	36	5	58
14	Tu	Jupiter sets 10 35 aft.	17	12	11	0	0	33	6	20	6	42
15	W	Machutus	19	11	morn.		0	55	7	6	7	31
16	Th		21	9	0	17	1	16	7	59	8	32
17	F	Hugh Bp. Linc.	22	8	1	36	1	36	9	8	9	48
18	S	Mars sets 9 35 aft.	24	6	2	59	1	58	10	28	11	6
19	Sun	23 Sun. aft. Trinity	26	5	4	24	2	23	11	41	—	—
20	M		28	4	5	51	2	55	0	13	0	42
21	Tu	Princess Royal born	30	2	7	17	3	35	1	10	1	37
22	W	St. Cecilia	31	1	8	34	4	28	2	2	2	26
23	Th	St. Clement	33	0	9	39	5	32	2	50	3	14
24	F	Venus sets 4 40 aft.	35	III	10	30	6	46	3	37	4	0
25	S	Catherine. Mich. T. ends	36	58	11	6	8	3	4	22	4	44
26	Sun	24 Sun. aft. Trinity.	38	57	11	35	9	19	5	6	5	27
27	M		40	56	11	57	10	32	5	48	6	10
28	Tu	Mercury rises 7 13 morn.	41	55	0 a	16	11	42	6	32	6	55
29	W		42	54	0	34	morn.		7	20	7	45
30	Th	St. Andrew	44	54	0	51	0	50	8	11	8	38

ASTRONOMICAL MEMORANDA.

12th day, Jupiter in quadrature with the Sun.
21st — Mercury in conjunction with the Moon.
22d — Venus in conjunction with the Moon.
25th — Saturn in conjunction with the Moon.
27th — Mars and Jupiter in conjunction with the Moon.
30th — Mars in conjunction with Jupiter.

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MOON'S QUARTERS.

☽ Full Moon, 7th day, at 0 h. 1 m. morning.
☾ Last Quarter, 14th day, at 0 h. 53 m. afternoon.
● New Moon, 21st day, at 5 h. 9 m. morning.
☽ First Quarter, 28th day, at 2 h. 53 m. afternoon.

☉ enters ♈ 22d day, at 10 h. 48 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	49	6	21 S.	46
7	11	51	31	22	35
13	11	54	14	23	9
19	11	57	9	23	26
25	12	0	9	23	25

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VII	III								
1	F	Saturn sets 7 3 aft.	45	53	1 a	7	1 m	56	9	4	9	31
2	S		46	52	1	26	3	3	9	57	10	24
3	Sun	Advent Sunday	48	52	1	47	4	10	10	51	11	17
4	M		49	51	2	13	5	17	11	43	—	—
5	Tu	Jupiter sets 9 28 aft.	51	51	2	45	6	21	0	9	0	34
6	W	Nicholas	52	50	3	27	7	22	0	58	1	22
7	Th		53	50	4	17	8	17	1	46	2	8
8	F	Conception B. V. M.	54	50	5	17	9	3	2	30	2	51
9	S		55	50	6	23	9	42	3	12	3	32
10	Sun	2 Sun. in Advent	56	50	7	34	10	13	3	52	4	12
11	M		57	49	8	48	10	38	4	31	4	50
12	Tu	Mars sets 9 45 aft.	58	49	10	4	11	0	5	10	5	30
13	W	Lucy	59	49	11	21	11	20	5	50	6	10
14	Th		VIII	49	morn.		11	40	6	32	6	55
15	F	Venus sets 5 3 aft.	1	49	0	39	0 a	1	7	22	7	54
16	S	Cam. T. ends. O! Sap.	2	49	2	0	0	23	8	30	9	11
17	Sun	3 Sun. in Advent	3	49	3	24	0	50	9	53	10	34
18	M	Oxford Term ends	4	50	4	47	1	25	11	14	11	51
19	Tu		4	50	6	8	2	10	—	—	0	24
20	W	Ember Week	5	50	7	19	3	9	0	54	1	21
21	Th	St. Thomas. Shortest Day	6	51	8	16	4	18	1	47	2	12
22	F		6	51	9	0	5	35	2	36	2	58
23	S	Mercury sets 4 19 aft.	7	52	9	33	6	53	3	19	3	39
24	Sun	4 Sun. in Advent	7	52	9	57	8	10	3	58	4	17
25	M	Christmas Day	8	53	10	20	9	24	4	36	4	55
26	Tu	St. Stephen	8	53	10	38	10	34	5	14	5	33
27	W	St. John Evan.	8	54	10	54	11	42	5	53	6	14
28	Th	Innocents	8	55	11	12	morn.		6	35	6	58
29	F		8	56	11	31	0	49	7	23	7	49
30	S		9	57	11	51	1	56	8	17	8	45
31	Sun	1 Sun. aft. Christ. Silv.	9	58	0 a	16	3	3	9	12	9	40

ASTRONOMICAL MEMORANDA.

6th day, Moon eclipsed and visible.
7th — Mercury in superior conjunction with the Sun.
21st — Mercury in conjunction with the Moon.
22d — Winter commences. Venus in conjunction with the Moon.
23d — Saturn in conjunction with the Moon.
25th — Jupiter in conjunction with the Moon.
26th — Mars in conjunction with the Moon; Venus in conjunction with Saturn.

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PATENTS FOR NEW INVENTIONS,

GRANTED BETWEEN SEPTEMBER 23. 1841, AND OCTOBER 1. 1842.

Subject.	Name.	England.	Scotland.	Ireland.
Air, supplying, in a respirable state under water	Vigers, Wm. Revell	July 7.	July 13.	
Ammonia, manufacture of	Newton, Wm. Edward	Nov. 9.	Dec. 7.	
Do.	Young, James	Nov. 11.		
Animal substances, preserving	Carson, Sam.	Aug. 3.		
Axles & Wheels, for railways	York, John Oliver	Dec. 21.		
Axles	Gibson, J.	Nov. 23.		
Do.	Bonveiron, Henry Alphonse Bonnevaille	Dec. 21.		
Bands, flat metal	Newall, Robt. Stirling	Nov. 16.	Jan. 20.	
Barometers	Readman, James	Mar. 7.		
Bed steps	Macauley, Thomas	Nov. 2.		
Beds, mattresses, &c.	Hall, James		Mar. 30.	
Bedsteads	Cook, B.	May 23.		
Do.	Kane, F.	Mar. 7.		
Do.	Wilson, J.	May 9.		
Boat, safety, or pontoon	Holcroft, Thomas	Oct. 28.		
Bobbin net, or twist lace	Poole, Moses	Nov. 2.		
Boilers, steam	Newton, W. E.	Mar. 10.		
Do.	Squire, John	Nov. 16.		
Do.	Hall, John	Dec. 9.	Dec. 17.	April 14.
			July 18.	
Do.	Hall, Edward	Jan. 11.		
Bolt, improved, for building and other purposes	Kettle, Wm. Robinson, Wakefield, Benjamin, and Crosher, William	Dec. 24.		
Bookbinding	Richards, T.	April 15.		
Do.	Gye, F.	June 2.		
Boots and shoes	Noel, W.	April 21.		
Do.	Mason, S.	Jan. 27.		
Do.	Baker, William	Jan. 27.	Feb. 23.	
Do. and clogs	Carlotti, Marc	April 8.		
Do. (mud)	Browne, J.	May 12.		
Bottle stoppers	Brockedon, W.	Mar. 21.	April 13.	
Bottles, covering and stopping necks of	Betts, John Thomas	Aug. 11.		
Breakwater	Tayler, Jos. Needham		Dec. 11.	Dec. 18.
Bricks (and artificial fuel)	Williams, Charles W.			Mar. 5.
Do.	Welch, Edward	Sep. 30.		May 26.
Do. and tiles	Irving, William	Dec. 7.	Dec. 10.	April 11.
Do.	Hunt, James	Jan. 31.	Mar.	Mar. 29.
Britannia metal and plated wares	Sturges, Richard Ford	Aug. 10.		
Brushes	Cole, J.	Jan. 15.		
Do.	Hancock, W.	Mar. 2		
Do.	Insole, James	Sept. 8.		
Burners	Poole, Moses		Jan. 7.	
Buttons	Aingworth, Benjamin	Oct. 7.		
Do.	Falconer, W.	April 13.		
Do.	Moss, I.	June 13.		
Do. (covered)	Chativin, John	July 16.		
Calculating	Marston, F.	Jan. 27.		
Candle lamps	Palmer, William	March 4.		
Candles	Tuck, Joseph Henry	Sept. 8.	Feb 23.	April 19.
Do.	Palmer, William	Nov. 9.	Nov. 12.	Feb. 26.
Do.	Kempton, W. H.	June 1.		Sept. 30.
Do.	Walker, F. P.	May 9.		

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Candlesticks	Clive, T.	April 7.		
Carding machinery	Waterhouse, Thomas	May 24.	July 27.	
Cards (for carding cotton)	Thornton, Wm. Carr	Dec. 21.		
Carpet weaving	Wood, W.	April 26.		
Carriages	Pape, J. H.	April 28.		
Do.	Johnstone, Alexander	July 23.	Aug. 2.	
Do., and for retarding progress of	Warburton, William	Sept. 8.		
Do.	Varley, John		Oct. 11.	
Castors	Stewart, James	Dec. 16.		
Do.	Fouremont, Adolphe	Dec. 21.		
Cement	Jeffrey, A.	April 15.		
Chalybeate	Bewley, Henry	June 23.		
Chemical vessels	Palmer, William	March 4.		
Chest, giving expansion to the	Harwood, John	Oct. 7.	April 6.	
Chimney sweeping	Haire, G.	May 9.		
Do.	Desanges, Sir Francis	Mar. 7.		
Chimnies (to prevent fire in)	Varroc, Eugene de	July 23.		
Chlorine	Lee, John		Jan. 19.	Sept. 7.
Chronometers	Dent, E.J.	March 21.		
Churn	Williams, Thomas	May 17.		
Cleaning roads	Whitworth, Joseph	Aug. 2.		
Clocks and time-pieces	Barwise, John, and Bain, Alexander		Oct. 15.	
Clogs and pattens	Carron, William	Dec. 21.		
Cocks and taps	Dashwood, Jon. Guy	Dec. 9.		
Do.	Chatwin, J.	June 9.		
Cocoa nut fibre	Logan, Robert		Oct. 27. May 28.	Dec. 18.
Combs	Baggaly, J. J.	Jan. 29.		
Do. (and brushes)	Hancock, W.	March 21.		
Combustion	Lejeune Jules	Jan. 29.		Sept. 6.
Do.	March, James Colley		Dec. 16.	Feb. 18.
Do.	Hall, Samuel	May 9.		Feb. 9.
Condensing and collecting the sulphurous and metallic vapours which are evolved in the treatment by heat of all kinds of ores	Lejeune, Jules	Nov. 4.		
Connectors or fastenings for garments and other uses	Smith, William Henry	Dec. 21.		
Controlling railway engines by electricity, and also giving signals	Wright, Thomas, and Bain, Alex.	Dec. 21.		
Copper, improvements in manufacture of	Boussons, Edward J. Fs. Duclos de	Nov. 11.		
Do. do.	Bell, Thomas	July 29.		
Cork cutting	Geeves, William	May 24.	July 29.	Sept. 30.
Do.	Lachenal Louis and Vieyers Antoine		Feb. 11.	Oct 18.
Corn drill	Irving, W.	June 7.		
Cotton, dressing, stiffening, and finishing; applicable also to the manufacture of paper, printed calicoes, &c.	Watson, Henry Hough	Dec. 21.	Jan. 18.	Feb. 23.
Cotton, spinning	Bodmer, John George	March 7.	May 16.	
Do., roving, and slubbing	Hardham, Samuel		Sept. 2.	
Do., silk and wool roving, spinning, and doubling of	Gore, Thomas		Sept. 24.	
Do. (doubling, twisting, twining, and finishing)	Balderston, James		Dec. 7.	
Cotton, and other fibrous substances, spinning	Smith, James, and Buchanan, James		April 13.	

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Coverlets, quilts, or wadding	Booth, John Peter	Nov. 11.		
Crushing machine	Green, J.	March 7.		
Cutting wood	Partridge, Reuben	March 14.		
Do.	Burnett, J.		March 14.	
Damasking	Newbery, George John	Aug. 18.		
Dies	Baggaly, J. J.	Jan. 27.		
Door handles	Greenfield, D.	Feb. 21.		
Drags or Breaks	Thatcher, Charles and Thomas	Aug. 31.		
Draining, &c.	Watson, R.	May 31.		
Dressing Yarn	Andrew, J.	Feb. 15.	April 6.	
Do. Wheat	Parkes, Z.	Mar. 21.		
Do. Cotton	Watson, H. H.	Dec. 21.	Jan. 18.	Feb. 23.
Do. Ores	Brunton, W.	May 19.		April 26.
Do. do.	Lejeune, Jules	Nov. 4.		
Dyeing and preparation of pigments or painters' colours	Roberts, Martin John, and William Brown	Oct. 26.	Nov. 10.	Nov. 15.
Dyeing	Kagenbusch, Peter	May 26.	May 17.	May 11.
Do.	Poole, M.	June 13.		
Elastic Fabrics	Bedells, C.	Jan. 13.		
Electricity, application of, to giving signals	Cooke, William Fothergill	Sept. 8.		
Do. do., to producing works of art in metal	Parkes, Alexander		Dec. 10.	
Embossing	Allen, M.		Mar. 2.	
Engines, Gas, Vapour, or Steam (communication)	Newton, William	Oct. 14.	Dec. 20.	
Excavating	Duncan, J.	Mar. 7.		
Do.	Newton, William		July 25.	
Fabrics, napped	Nickels, Christopher		Jan. 27.	
Do., knitted	Thorburn, James		Feb. 4.	April 12.
Felting	Poole, Moses			Sept. 7.
File for papers	Schlesinger, Jos.	July 16.		
Filters	Watson, John	Dec. 23.		
Fire, stopping progress of	Topham, Ovid	Dec. 21.		
Fire-arms (communication)	Poole, Moses	Oct. 14.		
Do., and bullets or other projectiles	Golden, William	Nov. 2.		
Do.	Rousseau, A.	Feb. 15.		
Flax and hemp	Marsden, Thomas, and Robinson, Solomon	Sept. 8.		
Flour, preparing from grain, potatoes, &c.	Bowles, Frederick	Sept. 15.		
Flues, tubular, of steam-boilers	Cutler, Job	Nov. 6.		
Fluids, evaporation of	Furnival, Jn. Bradford	Oct. 20.		
Flutes	Ward, C.	Jan. 18.		
Food for cattle	Daniel, Joseph Clisild	Mar. 31.	May 25.	Aug. 3.
Forcing and raising water and other fluids	Else, Richard	Aug. 18.		
Do. do., and conveying and drawing off liquids	Robson, John Wordsworth	Sept. 8.		
Forging, stamping, &c.	Nasmyth, James	June 9.	July 7.	
Fuel, artificial	Newton, William		Oct. 19.	Nov. 3.
Do.	Williams, C. W.			March 5.
Furnaces	Coupland, Michael		June 30.	Aug. 4.
Do.	Clarke, J. G. S.	April 6.		
Do.	Juckes, J.	Sept. 22.	Dec. 28.	April 21.
Do.	Williams, C. W.	Jan. 11.		
Do.	Heindricks, Floride		Oct. 30.	Oct. 18.

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Gas, manufacture of	Lowe, George		Nov. 24.	
Do. apparatus	Edge, T.	May 9.		
Do. burners	Bynner, Jeremiah	Nov. 2.		
Do., manufacture of	Crutchett, James	July 12.		
Do., supply of	Dodds, Isaac	Nov. 13.		
Do. burning	Boccius, Gottlieb	Jan. 27.	July 14.	Aug. 1.
Do. do.	Hedley, T. et al.	May 31.		
Do. do.	Phillips, H.	May 31.		
Gases, flow of	Newton, William	Feb. 25.		
Gasing thread	Thackery, J.	Jan. 15.		
Gasoscope	Warrick, J.	March 7.		
Gilding, &c.	Clements, J.	March 4.		
Glass	Dawes, J. B.	April 15.		
Do.	Chance, James T.	Jan. 7.		
Do. chimnies, improvements in for gas burners	Palmer, Henry George	Dec. 21.		
Do., ornamenting and colouring	Ayres, Charles Robert	July 23.		
Do., improvements in certain processes for ornamenting	Carr, John, and Ryles, Aaron	Nov. 9.	May 6.	
Do., for ornamenting	Aingworth, B.	June 4.		
Harbours, safety	Sleigh, A. W.	Feb. 8.		
Harness and saddlery furniture	Deakin, Thomas	July 12.		
Hats, caps, &c. (securing)	Biggs, Thomas	Oct. 7.		
Heating	Henderson, Robert	Dec. 9.		
Do.	Gillot, B.	Feb. 26.		
Do.	Haden, G.	Feb. 15.	Feb. 23.	
Do.	Hazard, R.	March 21.		
Heel plates	Boydell, J.	May 24.		
Hemp, flax, and wool, (spinning of)	William Craig, Robert Jarvie, and James Jarvie		Oct. 19.	
Hinges	Frampton, R.	March 7.		
Do.	Redmund, David	Aug. 25.		
Hooks and eyes	Church, William		Oct. 4.	
Horse hoe	White, John	Sept. 29.		
Do. rakes	Garrett, R.	June 13.		
Do. shoes	Rodway, Henry Barrow	March 7.	May 12.	July 1.
Jacquard loom	Goos, F.	May 23.		
Ice (substitute for)	Kirk, Henry	Nov. 2.		
Images on metallic surfaces	Hodgson, Richard	July 7.		
Inkstands	Freeman, M.	March 21.		
Instruments for filing or holding papers	Schlesinger, Joseph	July 16.		
Iron (balling or blooming)	Allerton, George	Nov. 11.		
Do.	Meckenheim, L. N. de	May 31.		
Do. tubing	Russell, Thomas Henry	March 7.	May 28.	Aug. 3.
Do. wheels	Slaughter, E.	March 4.		
Keel plates, iron grates, fencings, &c.	Boydell, James, jun.		June 30.	
Knitted fabrics	Thorburn, J.		Feb. 4.	April 12.
Knitting machinery	Tielens, Anthony	April 7.	Aug. 22.	Oct. 8.
Kitchen ranges	Jubber, H.	June 2.		
Lace, manufacture of	Crofts, William	Sept. 8.		
Lace machinery	Catford, W.	March 8.		
Do.	Newton, W.	Feb. 8.		
Do.	Nickels, Christopher, and Bedells, Caleb	Sept. 15.		
Lamps.	Kayser, P. J.	May 31.		
Do.	Young, W.	May 28.		Oct. 18.

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Lamps	Roberts, George	Aug. 15.		
Do.	Taylor, Josiah	Dec. 9.		
Do. and burners, and for supplying air and heat thereto	Newton, Wm. Edward	Dec. 21.		
Lanterns, horn, and manufacturing sheet, or leaves of horn	Burnell, John, jun.	Nov. 9.	June 8.	
Latches and locks	Strong, T. F.	March 28.		
Do. do.	Smith, Jesse	Nov. 9.		
Leather, improvements in manufacture of,	Wilson, Robert	Dec. 2.		
Do. do.	Bordier, Julius		March 11.	Feb. 14.
Lifting and forcing water	Jeffree, John Tresahar	Dec. 11.	July 6.	
Lighting	Cocking, S.	April 26.		
Do.	Poole, M.		Jan. 7.	
Do.	Tindall, W.	Jan. 19.		
Do. — *See also* GAS.	Goldsworthy, Gurney	Aug. 18.		
Likenesses, taking	Beard, R.	Mar. 10.		
Lithographic presses	Troisbrioux, A. de	April 21.		
Locks	Poole, M.	Jan. 15.		
Lock and key	Duce, J.	May 24.		
Do. do.	Williams, William	June 13.		
Locks and keys	Gerish, Fras. William		Sept. 2.	
Locks, improvements in construction of gun and pistol, and primers	Richards, Wm. Westley	Dec. 14.		
Locomotion	Gaunt, T.	June 21.		
Looms	Whitworth, James	Oct. 21.		
Do.	Osbaldiston, John	Feb. 15.		
Do.	Railton, J.	May 3.		
Do.	Trippett, W. L.	March 31.		
Do.	Newton, William		Sept. 17.	
Do.	Darker, William Hill, sen. and jun., and William Wood		Dec. 14.	
Lozenge cutting	Drew, Joseph		March 7.	
Machinery, improvements in, for constructing buildings and in raising and lowering weights, &c., (communication.)	Wilkinson, Henry	Dec. 9.		
Do. for raising weights	Taunton, Wm. George Henry	Dec. 11.		
Magnesia	Pattinson, H. D.	Sept. 24.		
Malt	Stead, Patrick	Sept. 22.		
Manure	Clisild, Daniel Joseph	Oct. 7.	Oct. 27.	Dec. 18.
Manures	Lawes, J. B.	May 23.		
Do.	Murray, Sir James	May 23.	May 12.	May 12.
Manuring powder	Albert, Dominic Frick	Feb. 10.		
Masts	Poole, Moses	Dec. 9.		
Matches, making	Partridge, Reuben	March 14.	April 20.	
Meat preserving	Benjamin, H.	Jan. 27.		
Do.	Bevard, J.	April 6.		
Metal pipes	Scott, John Harrison	July 6.		
Do. ships' boats	Fairbairn, William	July 7.		
Do. punching	Galloway, W. et al.	Jan. 27.		
Metallic tubes	Church, William	Dec. 16.		
Do. letters, figures, &c.	Dumont, Christopher		Dec. 16.	
Metals, cutting or shaping, and other substances	Davies, Henry	Oct. 21.		
Do., coating or covering	Talbot, William Henry Fox	Dec. 9.		
Do. do.	Leeson, H. B.	June 1.		

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Subject.	Name.	England.	Scotland.	Ireland.
Metals, coating or covering	Tuck, E.	June 4.		
Do. do.	Woolrich, John S.	Aug. 1.		
Meters for gas	Defries, Nathan, and Taylor, Nathaniel Fortescue	Aug. 18.		
Mineral colours	Roche, William	Sept. 3.		
Motive power	Petrie, William		Jan. 7. 13.	Oct. 8.
Do.	Baggs, I.	Feb. 9.		
Muffs, tippets, ruffs, mantillas, &c. &c.	Turner, Archibald	Aug. 3.		
Nail-making	Mabley, W. T.	May 23.		
Nails, screws, and chains	Onions, John	Nov. 11.		
Oakum	Trent, E. W.	Mar. 21.		
Odometer	Davis, Marcus	Oct. 7.	April 22.	April 18.
Oils	Hompesch, De, Theophile Anton Wilhelm			
Do.	Poole, M.	Feb. 21.		
Ores, dressing, and separating metals and minerals	Brunton, William	May 19.		April 26.
Do. do.	Lejeune, Jules	Nov. 4.		
Ovens, building and construction of	Venables, John, and Tunnicliff, John	Nov. 20.	April 25.	
Do.	Ridgway, William	Aug. 18.		
Paints	Annes, John		Nov. 12.	
Paper machinery	Hughes, J.	Jan. 29.		
Do.	Middleton, Thomas	May 23.	June 6.	
Paving	Stead, D.			Feb. 11.
Do.	Poole, Moses	Aug. 11.		
Do.	Bunnett, J.	June 21.		
Do.	Harlow, F.	Feb. 9.		
Do.	Hodgson, Richard			April 16.
Do.	Phipps, Alfred John	Aug. 1.		
Percussion Caps	Starkey, Thomas	Dec. 16.		
Piano Fortes	Stewart, James	Nov. 11.		
Do.	Broadwood, H. F.	Feb. 2.		
Do.	Lambert, T.	Jan. 15.		
Do.	Stewart, J.	May 24.		Feb. 14.
Do.	Wornum, R.	Feb. 15.		
Do.	Steward, John		Nov. 22.	
Pile driving	Taylor, James, jun.		Jan. 10.	
Do.	Wells, H. Augustus		Dec. 17.	
Pills	Palmer, W.	Mar. 21.		
Pins and pin-nails	Newton, William		Sept. 15.	
Piston rods	Thirlwell Thomas	Sep. 8.		
Plaited fabrics	Mertens, Antoine	Dec. 16.		
Do.	Nickels, Christopher	Feb. 10.	Jan. 27.	
			April 13.	
Do.	Poole, Moses		Mar. 29.	
Ploughing and raking land, and cutting food for animals	Sanders, John, Williams, William, Taylor, Sam. Lawrence, Armstrong, W. and David, Evan Will.	Sep. 22.		
Ploughs	Warren, J.	May 9.		
Pneumatic engine	Stuckey, William H.	July 12.		
Postage labels	Haughton, J.	Mar. 21.		
Potter's ovens	Venables, J. et al.		April 25.	
Power, application of, to communicate locomotion	Davies, Henry	Nov. 9.		
Preserving metals	Morewood, Edmund		April 7.	
Presses	Petigars, J. L. A.	Sept. 24.		

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Printing and delineating patterns, and printed cloths for floor-cloths	Newton, William Edw.	Dec. 14.		
Do. machinery	Beach, M. S.	Mar. 23.		
Do. stuffs	Hancock, C.	Feb. 8.		
Do.	Palmer, E.	Jan. 15.		
Do. machinery	Ollivant, George Bent, and Howard, Adam		Nov. 17.	
Propelling ships and vessels, improvements in	Marx, Francis	Dec. 16.		
Do.	Booth, Henry	Dec. 16.	April 13.	
Do.	Binge, William	Dec. 21.	Dec. 17.	
Do.	Bodmer, John George		Feb. 14.	
Do.	Chatterton, Richard Dover	Jan. 11.	April 22.	
Do.	Firchild, C. W.	Mar. 14.		
Do.	Jones, Tho. Stopford		Mar. 2.	Mar. 11.
Do.	Melville, J.	May 11.		
Do.	Wake, James, jun.	Sept. 9.		
Do.	Bird, John	July 7.		
Do. retarding, and stopping railway carriages	Benton, Robert	July 16.		
Do. human and other bodies	Cobbold, Edward	July 28.		
Pumps	Emslie, J. A.	June 9.		
Do.	Jeffree, J. T.	Jan. 11.		
Do.	Mannering, G. et al.		Feb. 16.	
Purifying gas	Hedley, Thomas, and Rodham, Cuthbert		June 7.	
Do. do.	Phillips, H.	May 31.		
Do. and preserving animal substances	Carson, Samuel	Aug. 3.		
Railway, carriages	Bishop, J.	May 23.		
Railways, improvements in signals on	Edwards, John	Dec. 11.		
Do., changing the line on	Austin, Charles Edward	Dec. 16.		
Do., improvements in giving signals on	Prowett, William	Dec. 16.		
Do.	Wright, T. & Bain, A.	Dec. 21.		
Do.	Guitard, Charles Fred.	Aug. 31.		
Do. and carriage ways, railway, and other carriages, and for propelling them	James, William Henry	Sept. 16.		
Raising water and other fluids	Mannering, Geo., and Harrison, Henry		Feb. 16.	
Do. do.	Stocker, S. and G.	Sept. 28.		
Do. do.	Bird, John	July 7.		
Do. lowering and transporting heavy bodies	Booth, John Peter	July 9.		
Registering distances	Davis, Marcus	Oct. 7.		
Regulating speed of steam, air, or water engines	Jouannin, Jean Bap. Français	July 9.		
Reins	Reed, J. et al.	April 6.		
Removal of sand, &c. from beds of rivers, &c.	Scamp, W.			Nov. 15.
Roads, cleaning	Whitworth, Jos.	Aug. 2.		
Roofing, &c.	Charité, R. A. J. J. et al.	April 26.		
Do.	Palmer, H. R.	April 26.		
Do.	Reed, J.	June 2.		
Do.	Williams, D.	June 13.		
Rotary motion for obtaining mechanical power and for raising and impelling fluids	Holt, Robert, and Jackson, Robinson	Nov. 2.	Dec. 11.	Dec. 31.

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Rotary motion	Barling, Joseph	July 16.		
Rotary engine	Beale, J. T.			Jan. 14.
Do. engines	Biram, Benjamin	Feb. 8.	Aug. 11.	
Do. do.	Dickson, J.	June 21.		
Do. machines to be worked by water	Whitelaw, James, and Stirrat, James		Nov. 3.	
Do. fans	Ruthven, Morris West		Dec. 16.	
Saddle-trees	Bencraft, S.	June 9.		
Saddles	Rolt, John	Sept. 15.		
Safety harbours	Sleigh, A. W.	Feb. 8.		
Sails	Barre, Matthias Nicholas La Roche	Oct. 7.	April 19.	July 1.
Salt, manufacture of, from brine	Garnett, John and Williams Joseph	Nov. 9.		
Do.	Waterton, H.	Jan. 13.		
Scaffolding for building purposes	Buckwell, William	Dec. 16.		
Scent-bottles	Haseler, G. C.	March 3.		
Screws	Warren, James		Sept. 30.	Aug. 25.
Screws, screw-blanks, and rivets	Newton, William Edward	Sept. 8.		
Sealing-wax	Davis, Isaac	Nov. 11.		
Shears	Ingram, Thomas Wells	Oct. 7.		
Sheathing of ships	Jeffrey, Alfred		Oct. 27.	
Do.	Norton, John	Dec. 16.		
Ship-building	Ditchburn, Thos. Josh.		Jan. 6.	
Do.	Holdsworth, A. H.	June 11.		
Silk (preparing for spinning)	Templeton, Archibald	Dec. 9.	Dec. 16.	
Do. printing	Kingdon, K.	April 21.		
Do. weaving	La Rivière, M.	March 1.		
Smelting	Ions, James	Jan. 13.	March 10.	Feb. 11.
Smoke, prevention of	Hedley, T.	Mar. 7.		
Soap	Farina, C.	April 15.		
Do.	Normandy, A. R. L.		Jan. 13.	April 19.
Do.	Sturtevant, R. Lawr.		March 14.	Nov. 18.
Soldering iron	Raybould, William	Aug. 18.		
Spindle-flyers and bobbins	Mac Donough, Montagu	Jan. 6.	Jan. 4.	Feb. 7.
		April 26.	June 14.	
Spinning	Rotton, Otto			Feb. 16.
Do.	Templeton, A.			
Do.	Addison, W. B.	Feb. 10.		
Do.	Jarman, George, Cook, Robert, and Wordsworth, Joshua	Feb. 14.	March 9.	Mar. 11.
Do.	Potter, J.	May 25.		
Do.	Smith, James	April 6.	April 13.	
Starch	Colman, James	Dec. 9.	Dec. 10.	Feb. 19.
Do.	Berger, William Thos.		Sept. 22.	Oct. 18.
Stave-cutting	Conder, Francis R.			Feb. 26.
Steam-engine	Barnes, J.	Jan. 13.		
Do.	Carr, John Thomas		Jan 19.	
Do.	Crampton, T. R.	Feb. 15.		
Do.	Jones, J.	Feb. 4.		
Do.	Journet, P.	Jan. 27.		
Do.	Lewthwaite, J.	Feb. 15.		
Do.	Lamb, J.	April 15.		
Do.	Pilbrow, J.	May 23.		
Do.	Varley, J.	April 28.		
Do.	Woodcock, John	June 7.	Aug. 1.	
Do. and boilers	Napier, David	Aug. 9.		
Do.	Miller, Joseph	Mar. 29.		
Do.	Jones, Thomas	Oct. 21.		
Do.	King, Henry	Nov. 4.		

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Steam-engines, for raising and forcing water, and propelling vessels	Loosey, Charles	Dec. 16.		
Do. condensing	Bould, John	Dec. 16.		
Do.	Beale, J. T. and Benj.		Sept. 8.	Jan. 14.
Do. and boilers	Craddock, Thomas		Sept. 16.	
Do. (marine)	Miller, Joseph		Oct. 8.	
Do.	Fox, John Elliott		July 18.	
Steam-vessels for removing sand, &c. from harbours, rivers, &c.	Scamp, William		Sept. 21.	
Steel	Brown, Henry		Dec. 20.	
Stockings	Sneath, Charles		Sept. 13.	Sept. 24.
Stocks, taps, &c.	Bodmer, John George		Jan. 13.	
Stones, marble, &c., improvements in cutting, dressing, preparing, and polishing, and forming flat or rounded mouldings, and other figures thereon	Neilson, William, Lyon, David, and M'Onie, Peter		Oct. 29.	
Stoves	Brown, Frederick	Sept. 24.		
Do.	Walker, Thomas	Aug. 9.		
Strap or band for driving machinery	Edwards, John	Nov. 9.		
Stretching-frame	Morand, S.	Feb. 26.		
Sugar, manufacture of	Manwaring, William	Nov. 23.		
Do. filters	Watson, J.	Dec. 23.		
Sulphate of soda	Seybel, Julius	March 31.	Aug. 11.	
Tallow, bleaching	Wilson, R. H.	June 21.		
Tanning	Cox, John	June 21.	June 23.	
Do.	Bordier, J.	Jan. 13.	Mar. 11.	Feb. 14.
Do.	Warrington, R.			Aug. 6.
Tapes	Chesterman	Jan. 11.	April 22.	
Telegraph	Hughes, J. G.	June 9.		
Temperature of fluids	Clement, Jean Leandre	Jan. 12.		
Threshing machine	Atkinson, Josh.		May 4.	
Do.	Dry, John	Feb. 2.		
Tilling land	Hall, Jos.	Jan. 6.		
Do.	Vavasour, Lady Ann	Jan. 7.		
Tools	Barclay, H.	April 30.		
Trowsers	Mege, J.	April 26.		
Trusses	Green, A.	March 15.		
Types	Benjamin, Nathaniel		Feb. 11.	
Type setting	Rosenborg, F.	March 21.		
Umbrellas	Ruben, J.	Jan. 13.		
Unloading	Wilkinson, H.	May 31.		
Ventilation of mines	Booth, John Peter	July 9.		
Do. of carriages, and cabins of steam boats	Hazard, Robert	Sept. 3.		
Warming and ventilating buildings	Haden, George		Feb. 23.	
Watches	Massey, Edward	Oct. 14.		
Do., and chronometers and clocks	Perrin, Charles Henri	Aug. 8.		
Water, forcing, &c.	Else, Richard	Aug. 18.		
Do.	Mannering, G., et al.		Feb. 16.	
Do.	Bird, John	July 7.		
Do.	Stocker, S. and G.	Sept. 28.		
Do.	Robson, J. W.	Sept. 8.		
Do.	Jeffree, John T.	Dec. 11.	July 6.	
Water closets	Smith, T.	March 1.		
Waterproof fabrics, improved manufacture of	Fanshawe, John Americus	Dec. 16.	June 30.	

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Subject.	Name.	England.	Scotland.	Ireland.
Weaving	Sanderson, W.	May 9.		
Do.	Railton, John	May 3.	June 6.	
Do., and twisting, spooling, and warping woollens	England, George		Sept. 30.	
Weighing machine	Cotton, W.	June 13.		
Do. do.	Newton, William	March 7.	April 27.	May. 7.
Do. do.	Wilkinson, H.	Dec. 9.		
Do. do.	Taunton. W. G. H.	Dec. 11.		
Do. do.	Booth, J. P.	July 9.		
Whalebone	Kortwright, Lawrence		Sept. 14.	Nov. 3.
Wheat, dressing	Parkes, Z.	Mar. 21.		
Wheels	Banks, Thomas	June 13.	July 6.	Oct. 8.
Do.	Losh, W.	April 28.		
Do. and brakes	Smith, H.	March 10.		
Do. and axletrees for railways	Lee, John	Aug. 3.		
Do. of skidding of	Wright, Joseph		Oct. 27.	
White lead	Pattinson, Hugh Lee	Sept. 24.	Feb. 25.	
Do.	Wildes, George		March 16.	April 19.
Windlasses	Robinson, John	May 2.		
Do.	Betteley, Josh.	Aug. 11.		
Wire cards	Birkby, John	Feb. 25.		
Wire ropes	Newall, R. S.		Jan. 20.	
Wood, cutting and encrusting to present a sure footing for horses, &c.	Gurney, Richard	Nov. 25.		
Wood cutting	Burnett, William H.		March 14.	
Wood embossing	Allen, Matthew		March 2.	
Wood paving	Mertens, Antoine	Jan. 22.		
Do.	Reynolds, Osborne	Feb. 25.		
Do.	Stead, D.			Feb. 11.
Do.	Perring, John	July 7.		
Do.	Mortimer, Henry	Nov. 16.		
Wool, combing and drawing, and certain descriptions of hair	Ross, Henry	Oct. 15.		
Wool, cleansing and dyeing, and washing and bleaching cotton yarns, &c.	Newton, William	Dec. 21.		
Do., combing and drawing	Donisthorpe, John E.	July 6.		
Do., do.	Preller, Charles A.	July 7.	July 13.	Sept. 30.
Do., cleansing	Partridge, Josh.	July 23.		
Do., preparing and combing	Hendry, Thomas	Aug. 25.	July 27.	
Do., cleaning	Hickes, George		Dec. 10.	
Do., combing	Ross, Jesse	Nov. 9.		
Woollen cloths, manufacture of	Hurst, William, and Weight, Josh.	Oct. 7.		
Do. do.	Smith, Junius	April 20.		
Wrought iron	Jessop, Sydney	March 21.		
Yarn, spinning	Garnett, Joseph, and Mason, John		March 8.	
Yarns or warps	Andrew, James	Feb. 15.	April 6.	

COPYRIGHT OF DESIGNS.

By the Consolidated Designs Copyright Act, 5 & 6 Vict. c. 100., which came into operation the 1st September, 1842, a copyright or property is given to the authors or proprietors of "original designs for *ornamenting* any article of manufacture or substance," for the various terms placed opposite the following classes :—

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CLASS.	ARTICLE.	COPYRIGHT.
1.	Articles in metal	3 years
2.	Articles in wood	3 —
3.	Articles in glass	3 —
4.	Articles in earthenware	3 —
5.	Paper-hangings	3 —
6.	Carpets	3 —
7.	Shawls (patterns printed)	9 months
8.	Shawls (patterns not printed)	3 years
9.	Yarn, thread or warp (printed)	9 months
10.	Woven fabrics, not furnitures (patterns printed)	9 —
11.	Woven fabrics, furnitures (patterns printed)	3 years
12.	Woven fabrics (patterns not printed)	12 months
13.	Lace and all other articles	12 —

The design must be strictly for the "ornamenting" of "some article of manufacture or substance." By the Act of 2 Vict. c. 17., which established a copyright in a large class of designs not previously protected, it was clearly the intention of the Legislature to benefit only what are popularly understood by the term "arts of design;" but, in consequence of a certain laxity in the wording of the Act, a vast number of articles came to be registered under it, which had no claim to that character, and could only be legitimately protected by letters patent; as, for example, locks, ballcocks, syringes, hand-drills, garden engines, kitchen-ranges, chimney sweeping machines, parallel motions, &c. The object in now using the qualifying word "ornamenting" is to put an end to this abuse. Nothing that does not come, really and truly, under the denomination of "arts of design," can now be protected by registration. The "ornament" may consist either in the "pattern," as in figured silks, muslins, &c.; or in the general "shape or configuration" of an article, as a cup or vase; or in the design, engraved or otherwise impressed upon such cup or vase; or in both the general shape or configuration and the engraved design. But in every case it must be ornament that is external and visible. The ornament, too, must be the main, if not sole, object of the design, and not merely a result incidental to it. There may, for example, be shapes and configurations given to articles for purposes of utility, which may happen to be ornamental also — as, for example, carriage-springs, chimney-cowls, &c.; but such articles cannot be fairly considered as coming within either the letter or spirit of this Act. Wherever beauty of form, or elegance of ornament, is not the principal object which a designer has in view, he may be quite certain that he has no legal title to protection by registration.

The articles may be either "wholly or *chiefly*" of metal, or wood, or glass, or earthenware: which obviates a considerable hardship frequently experienced under the former Act, by which it was required that they should be wholly of some one substance or other. For example, a metal teapot was not a metal teapot within the meaning of the Act, because it had pieces of wood, or some other non-conducting substance, interposed between the handle and body, to intercept the heat: and a silver fork was no better than a wooden one, because it had, for a like reason, an ivory or horn handle.

The rights conferred upon the authors or proprietors of original designs are subjected to the following conditions: —

1st. The design must be registered.

2d. After registration, every article of manufacture published by the proprietor on which such design is used, must have thereon a particular MARK, which will be exhibited on the certificate of registration.

These conditions being observed, the right of the proprietor is protected from piracy by a penalty of from 5*l.* to 30*l.* for every offence, each individual illegal application or sale of a design constituting a separate offence. This penalty may be recovered by the aggrieved party either by action in the superior courts, or by a summary proceeding before two magistrates.

If a design be executed by the author on behalf of another person for a valuable consideration, the latter is entitled to be registered as the proprietor thereof; and any person purchasing either the exclusive or partial right to use the design is, in the same way, equally entitled to be registered; and for the purpose of facilitating such transfers, a short form is given in the Act.

A penalty of 5*l.* is imposed in the case of any person using the registration mark on any design not registered, or the copyright of which has expired, or when the design has not been applied within the United Kingdom.

All designs of which the copyright has expired may be inspected at the Registrar's Office on the payment of a small fee; but no design, the copyright of which is existing, is in general permitted to be seen. Any person, however, may, by application at the office, and on production of the registration mark of any particular design, be furnished with a certificate of search, stating whether the copyright be in existence, and in respect to which article of manufacture it exists; also, the term of such copyright and the date of registration, and the name and address of the registered proprietor. Any party may also, on the production of a piece of the manufactured article with the pattern thereon, together with the registration mark, be informed whether such pattern, supposed to be registered, be really so or not.

INSTRUCTIONS FOR REGISTERING.

All persons wishing to register a design must take or send to the Registrar's Office two copies thereof, together with the proper fees. These copies may consist either of portions of the manufactured articles, when such can conveniently be done (as in the case of *paper hangings*, *calico prints*, &c.),

or else of prints or drawings which, whether coloured or not, must be correct representations of the design. These must be accompanied with the name and address of the proprietor or proprietors, or with the title of the firm under which he or they may be trading, and the place of carrying on business, and *also with the number of that one of the above classes*, in respect of which such design is intended to be registered. After the design has been registered, one of the two copies is filed at the office, and the other is returned to the proprietor, with a certificate annexed, on which will appear the mark to be placed on each article of manufacture on which the design is used.

A design may be registered in respect of one or more of the above classes, according as it is intended to be employed in one or more species of manufacture, but separate copies must be furnished, and a separate fee paid on account of each separate class, and all such registrations must be made at the same time.

All communications with the office for the registration of designs may be made either through the general post or any other mode of conveyance, provided the carriage be paid; and if the proper fees, or any order for payment, be enclosed, the design will be duly registered, and the certified copies returned to the proprietor.

The Registrar's Office is open every lawful day, between the hours of 10 in the morning and 4 in the afternoon; and designs and transfers are registered from 11 until 3; and the following are the fees ordered to be paid by the Treasury: —

TABLE OF FEES
FOR REGISTERING DESIGNS.

	L.	*s.*	*d.*
Class 1	3	0	0
Class 2	1	0	0
Class 3	1	0	0
Class 4	1	0	0
Class 5	0	10	0
Class 6	1	0	0
Class 7	0	1	0
Class 8	1	0	0
Class 9	0	1	0
Class 10	0	1	0
Class 11	0	5½	0
Class 12	1	0	0
Class 13	1	0	0
Transfer	1	0	0
Certifying design same as registration fee, but for class 1	1	0	0
Cancellation or substitution	1	0	0
Search	0	2	6
Inspection of designs of which the copyright has expired, each class	0	1	0

Office of Registrar of Designs, 35. Lincoln's Inn Fields.
Registrar, F. B. Long, Esq.

IMPROVEMENTS IN THE INTERNAL CONSTRUCTION OF FACTORIES.

Factories, as hitherto constructed, consist generally of story piled upon story to a great height: but some have been recently built all in one flat or floor, which possess many advantages over the former in point of convenience and salubrity. The first of this description was erected by Mr. Smith of Deanston, near Stirling (the inventor of the subsoil plough); and it is thus described by Mr. Chadwick in the Report of the Poor Law Commissioners on the sanatory condition of the labouring population.

"The principle of the improvement of places of work which constituted the chief object of attention at Deanston, was the erection of manufactories in one large flat or ground floor, instead of story piled upon story, as in the old mode.

"Mr. Smith had constructed a new department of the cotton mill in one room or flat, which covered about half an acre of ground. The roof was composed of groined arches in divisional squares, of 33 feet 6 inches, supported on cast-iron columns, which were hollow, and through which the drainage of the roof was effected. In order to render the roof of the building water-tight, the outer superficies of the arches were covered with a coat of common plaster; over which, when dried, was laid a coating of coal tar, boiled to a pitchy consistence, and mixed with sand, laid on a thickness of three quarters of an inch. Over this was laid a surface of from 12 to 16 inches of garden soil, which prevents the injurious effects on the pitch of the frost in winter, and the sun in summer.

"The height of this large room was 12 ft. from the floor to the spring of the arches, and 6 feet rise, giving a height to the room in which the operatives were engaged of 18 feet. The height of the ordinary rooms in which the workpeople in manufactories are engaged is not more than from 9 to 11 feet. This restricted space arises from various points of economy (now considered to be mistaken) in the old modes of constructing manufactories, which were first erected in towns where land was dear, and in times when the immediate economy of capital was of more pressing importance. The adverse consequences to the operatives are the restriction of space for air; that the heat and effluvia of the lower rooms are communicated to the rooms above; and that the difficulty of ventilating them is exceedingly great, especially in the wide rooms, where it is found to be practically extremely difficult to get a current of fresh air to pass through the centre. The like difficulties have been heretofore experienced in respect to the ventilation of large ships. There is also in the mills of the old construction the additional

fatigue of ascending and descending to the higher rooms, and carrying materials. To avoid this, in some instances, machinery is resorted to.

"The ventilation through the side windows of large rooms is generally found to be imperfect and inconvenient in many of the processes, and annoying to the workpeople, from the influx of the air in strong currents. The arrangements for ventilation through the roof of this room appeared to be highly advantageous. The light was brought in from above, through openings 8 feet in diameter, at the top of each groin, surmounted by domes or cones of glass, at the apex of which there were openings of about 16 inches in diameter, with covers that could be opened or shut at pleasure to admit of ventilation. The better distribution of the light for the work from these openings was one advantage they appeared to possess over the ordinary mode of getting light from side windows.

"The chief arrangements from below for ventilation were made by tunnels 10 feet distance from each other, carried across and underneath the floor of the building, and terminating in the open air on either side. The covers of these tunnels were perforated with holes, of about an inch in diameter, and 12 inches apart, disposed through the floor so as to occasion a wide and uniform distribution of fresh air throughout the whole building, on the same principle as that adopted for the admission of fresh air through the floor of the House of Commons. In winter time the fresh air admitted was warmed on the same principle, by pipes of hot water, to prevent the inconvenience of the admission of currents of cold air. The whole building, was from its size and arrangements, kept at a steady temperature, and appeared to be less susceptible than other buildings to atmospheric influence. The shaftings for the conveyance of the power were carried through the tunnels, and straps or belts from the shafts rise through the cover of the tunnels, and, by their motion, aid in promoting the circulation of the air. The possibility of fatal accidents from the persons being caught by the straps and wound round the shafts, was by this arrangement entirely prevented. The tunnelling under this arrangement constituted a boxing off of the whole of the shafting. Another advantage from the removal of the driving-straps from above was, that the view over the whole room was entirely unimpeded.

"Another structural improvement was in the use of a thin flooring of wood over the solid base of stone floors. The floor so arranged affords the solidity of the stone floor, and inconsiderable danger of combustion; whilst the advantages of the wooden surface to the workers were a diminution of swelled ankles and rheumatic affections of the joints, often produced by working bare-footed on stone floors.

"There were no entries made from which I could obtain for comparison an account of the amount of sickness experienced by the workpeople in this new room; but it was obvious that the improvement must be considerable, and it was attested by the rosy and fresh countenances of the females and of the workpeople generally. A considerable improvement was manifest in the health of those workpeople who had previously worked in the older and less spacious rooms.

"The improvement of the place of work was combined with improvements in the residences of the workpeople. About one half of the hands employed in the mills resided in houses near the works, which were well drained; the ashes and other refuse was cleared away from the village every morning between six and seven o'clock, and carried to a general dungstead at a distance, for use on their gardens. On enquiry as to the state of the health of the workpeople living in these improved tenements, it appeared that they had not one half the amount of sickness experienced by the rest of the workpeople who lived in the common ill-regulated houses about a mile distance. The whole population had fewer diseases than any other class of the population of the surrounding country; they presented fewer cases of rheumatism, and there were scarcely any lung diseases among them; their general health was decidedly better than that of the adjacent agricultural population.

"The chief advantages of the improved arrangements of the places of work were, on the side of the workpeople, improved health; security for females and for the young against the dangers of fatal accidents, and less fatigue in the execution of the same amount of work. But beyond these, the arrangement of the work in one room had moral advantages of high value. The bad manners and immoralities complained of as attendant on assemblages of workpeople of both sexes in manufactories, generally occur, as may be expected, in small rooms and places, where few are employed, and that are secluded from superior inspection and from common observation. But whilst employed in this one large room, the young are under the inspection of the old; the children are, in many instances, under the inspection of parents, and all under the observation of the whole body of workers, and under the inspection of the employer. It was observed that the moral condition of the females in this room stood comparatively high. It would scarcely be practicable to discriminate the moral effects arising from one cause, where several are in operation; but it was stated by ministers, that there were fewer cases of illegitimacy and less vice observable among the population engaged in this manufactory than amongst the surrounding population of the labouring class. The comparative circumstances of that population were such as, when examined, would establish the conclusion that it must be so.

"The first expense of such a building is

higher than a manufactory of the old construction, but it appeared to possess countervailing economical advantages to the capitalist, the chief of which are,—this same facility of constant general supervision, the increase of the certainty of superintendence, and the reduction of the numbers of subordinate managers, the increase of efficiency of management, and a diminution of its expense. Another advantage arose to the manufacturer in the superior action of the machinery. In mills of the ordinary construction, the machinery is frequently deranged in its structure, and put out of order by the yielding and unsteadiness of the upper floors; the machinery erected on the ground floor has a firm basis, and a steady and more durable action. The other advantages presented were, the saving of labour in transporting the material from one process to another, a labour which is often considerable in expense as well as in inconvenience, in lifting it into the higher rooms; the reduction of the hazard of fire, and consequently in expense of insurance against it, as fire could scarcely take place, and certainly could not rapidly extend, in a manufactory so constructed. These several sources of economy Mr. Smith calculated would more than compensate for any increase of ground-rent, even if the building were erected on land costing 1000*l.* per acre.

"Mr. Marshall, of Leeds, on consulting with Mr. Smith, has constructed a new manufactory on the principle of that in Deanston in Leeds, where ground is valuable. This manufactory covers more than two acres of ground, and is reported to be eminently successful. Power looms are frequently arranged in buildings of one story, and I was informed of another manufactory in Lancashire, nearly as large as that of Messrs. Marshall's, built on one floor, but it did not appear to possess the arrangements for ventilation and warming, and the other arrangements necessary to the complete action of a place of work on the plan of that at Deanston.

"Mr. Smith considers that the principle of arrangement for superior inspection and management of a manufactory is equally applicable to agricultural operations, and that it would be proportionately advantageous in the superior ventilation and equality of temperature for cattle, in the avoidance of labour, and wet and cold, in removing from one small separate building to another, and in the transport of produce, to have all under one large roof, where the whole direction and inspection of the homestead farming operations are brought under one view.

"Of the manufacturing advantages of such arrangements I have had strong testimony; of the advantages of such arrangements to the health and moral and social condition of the workpeople, I could not entertain the slightest doubt. I feel confident that the more closely it is examined, the more clearly will the coincidence which I have endeavoured to trace, of pecuniary interest, with the health and the highest physical and moral improvement of the lowest of the labouring classes, be established. Mr. Smith avowed his confidence in this coincidence, from his own experience and observation, as a practical principle. The improved health of the workpeople was attended by more energy and better labour, by less of lassitude and waste from relaxed attention; by fewer interruptions from sickness, and fewer spare hands to ensure the completion of work. Under the persuasion of the coincidence of interest, he had endeavoured to direct the structural alterations to the promotion of the health of the workpeople; he believed they might be advantageously carried further, and had it in contemplation to make arrangements to promote habitual bathing amongst them. He had, moreover, retained the services of a medical gentleman to inspect the workpeople from time to time, and give them timely advice, and, as far as possible, to prevent disease. He agreed, and had long considered, that it was in the power of the masters of Britain 'entirely to extirpate excessive and habitual drinking. We never,' said he, 'permit a man to come near the works who is in the slightest degree intoxicated, and never permit any one to be absent one day drinking. You never can be well or cheaply served by a dissipated workman. The most skilful workman, the man whose services I can the least spare, must, if he takes to drinking, leave the place. It may occasion immediate inconvenience, and even immediate loss; but if the rule be steadily applied, it will contribute to the comfort and the profit of the master as well as of the man."

The factory, on the same plan, which has been erected by Messrs. Marshall and Co. at Leeds, consists of one room, 396 feet long by 216 feet wide, covering nearly two acres of ground. The roof is formed of brick groined arches, 21 feet high by 36 feet span, upon cast-iron pillars: an impermeable covering of coal-tar and lime is laid on a coating of rough plaster over the arches, and upon that is a layer of earth 8 inches thick, sown with grass. This immense room is lighted and ventilated by a series of skylights 13 feet 6 inches diameter — one at the centre of each arch. A vaulted cellar with brick pillars extends under the whole of the building, and contains the shafts for communicating the motion, from a pair of engines of 100 horses power, to the machinery in the mill — the flues and steam-cases for warming and ventilating — the revolving fan for urging the air into the room, with the gas and water pipes; and the remainder of the space is appropriated for warehouses.

The heating and ventilating are effected by a large fan, which forces the air through the pipes of two steam chests, each 10 feet long, and containing together 364 pipes of 3¾ inches bore: the temperature can be regulated by the quantity of

steam which is admitted into the chests, or by allowing a portion of cold air to pass by without traversing the pipes: valves and doors in the flues permit any temperature which is desired to be obtained, or that degree of moisture which is essential for some part of the process of working flax.

The total cost of this mill, including the ornamental stone front, was 27,443*l.*, which is stated to be about the same cost as that of a good fire-proof mill on the common plan; but as this mode of construction was novel to the workmen, it is probable that a second building of the kind would be less expensive.

The cost of Mr. Smith's building was 30*s.* per square yard of area covered, which was less than the cost of Messrs. Marshall's mill, but building materials are much cheaper at Deanston than at Leeds."

INTERNAL REGULATIONS OF FACTORIES.

USE OF STIMULANTS WHILE AT WORK, PAYMENT OF WAGES, DRESS, ETC.

We have seen in the preceding article how much the health and well-being of mechanics, who are obliged to labour in large numbers within doors, may be promoted by improvements in the construction of the factories and other large buildings where they are employed, and for which improvements they must look to their masters alone. We now propose to collect together some equally remarkable illustrations of the good which masters may do by the internal regulations of their establishments, and by their personal influence with their workmen. They are selected from a large mass of most valuable information on the State of the Labouring Population, which has been recently collected from all parts of the kingdom under the auspices of the Poor Law Commissioners.

The use of Stimulants while at work.—Mr. William Fairbairn, the head of one of the largest engineering establishments in Manchester, where about 600 men are constantly employed, in answer to an inquiry respecting their habits of sobriety, gives the following evidence:—

"I strictly prohibit, on my works, the use of beer or fermented liquors of any sort, or of tobacco. I enforce the prohibition of fermented liquors so strongly, that if I found any man transgressing the rule in that respect, I would instantly discharge him without allowing him time to put on his coat.

"Have you any peculiar grounds for adopting this course?—No; but as respects myself I wish to have an orderly set of workmen; and, in the next place, I am decidedly of opinion that it is better for the men themselves and their families.

"Are you aware that it is a prevalent opinion that strong drink is necessary as a stimulus for the performance of labour?—I am aware that that was a prevalent opinion amongst employers of labour; but it is now very generally abandoned: there are nevertheless some foundries, in which there is drinking throughout the works all day long. It is observable, however, of the men employed as workmen, that they op not work so well; their perceptions are clouded, and they are stupified and heavy. I have provided water for the use of the men in every department of the works. In summer time the men engaged in the strongest work, such as the strikers to the heavy forges, drink water very copiously. In general, the men who drink water are really more active, and do more work, and are more healthy than the workmen who drink fermented liquors. I observed, on a late journey to Constantinople, that the boatmen or rowers to the caiques, who are perhaps the first rowers in the world, drink nothing but water; and they drink that profusely during the hot months of summer. The boatmen and water-carriers of Constantinople are decidedly in my opinion the finest men in Europe, as regards their physical development,—and they are all water-drinkers; they may take a little sherbet, but in other respects are what we should call in this country tee-totallers.

"What is their diet?—Chiefly bread, now and then a cucumber, with cherries, figs, dates, mulberries, or other fruits, which are abundant there; now and then a little fish.

"Do they ever use animal food?—Occasionally I believe the flesh of goats, but I never saw them eating any other than the diet I have described.

"Did they appear to eat more than the European workmen?—About the same; if any thing, more moderate as respects the quantity."

Payment of Wages.—Mr. Peter Fairbairn of Leeds, the brother of Mr. William Fairbairn of Manchester, and who also employs about 600 men, gives the following instructive evidence on this head:—

"Have you ever observed any effects produced in the habits of the labouring classes, in respect to drinking intoxicating liquors, by the mode in which they are paid their wages?—Yes, there are two modes in which wages are most frequently paid, and both these modes are prejudicial in their effects. The first effect is connected with the place of payment. Some masters pay at the public-house; others pay the men at the counting-house after the work is completed. The effects produced by payment at the public-house are to oblige the workman to drink; he is kept waiting in the public-house during a long time, varying from two to three hours, sometimes as

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much as five hours. The workman cannot remain in the house without drinking, even if he were alone, as he must make some return to the landlord for the use of the room. But the payment of a number of men occupies time in proportion to their numbers. We find, that to pay our own men in the most rapid way requires from two to three hours. The assembled workmen, of course, stimulate each other to drink. Out of 100 men, all of whom will probably take their quart of porter or ale, above a third will go home in a state of drunkenness — of drunkenness to the extent of imbecility. The evil is not confined to the men: the destructive habit is propagated in their families. At each public-house a proportion of the poor women, their wives, attend. According to my own observation, full 10 per cent. of the men have their wives and children in attendance at the public-house. The poor women have no other mode of getting money to market with on the Saturday night, than attending at the public-house to get it from their husbands. They may have children whom they cannot leave at home, and these they bring with them. The wives are thus led to drink, and they and their children are made partakers at the scenes of drunkenness and riot; for there are not unfrequently quarrels, leading to fights, between the workmen when intoxicated.

"Do not these late hours, consequent on such a mode of payment, also lead them to the inferior markets, and prejudice the domestic economy of the labourer's household? — Yes, they have the less money to purchase with, and must purchase an inferior quality of provisions. I have observed that they do so. They are driven to the inferior shopkeepers who keep open late, and they are also driven to make purchases on the Sunday morning. It is only the inferior shopkeepers, or hucksters, who will sell on the Sunday morning, and they sell an inferior commodity at a higher price. Then the Sunday morning is thus occupied; the husband, and sometimes the wife, is kept in a state of feverish excitement by the previous night's debauch; they are kept in a state of filth and disorder; even the face is unwashed; no clean clothes are put on, and there is no church attendance, and no decency. Indeed, by the pressure of the wants created by habits of drinking, there is soon no means to purchase clean or respectable clothes, and, lastly, no desire to purchase them. The man, instead of cleaning himself and appearing at church on the Sunday, or walking out with his family on a Sunday afternoon in a respectable condition, remains at home in filth and in a filthy hovel. Of course there are no contributions to sick clubs under such circumstances; and if the workman has been previously led to join a club, he is almost always in arrear with his contributions, and is ultimately expelled. On the occurrence of the disease to which such habits predispose him, there is nothing but the most abject and complete destitution and pauperism. I have served the office of churchwarden and overseer in Leeds three years, and having attended the weekly Board, where applications for relief are made, I have seen the end of this train of circumstances, in the applications for relief from parties who had previously been in the receipt of good and sufficient wages (and even high wages), to have prevented such applications. I have observed the whole train of these consequences in several large works in London as well as in this town.

"Are there not consequences too, to the employers themselves, as well as to the rate-payers, in connection with the habits of labourers thus created? — One consequence of these habits is the loss of time at the commencement of the week, and the comparative inefficiency of the workmen when they do come. The workman who has been absent from drunkenness comes to his work pale, emaciated, shattered, and unnerved. From my own observation in my own branch of manufacture, I should say that the quantity and quality of the work executed during the first day or so would be about one-fifth less than that obtainable from a steady and attentive workman.

"This deterioration, then, in a large number of workmen engaged in a manufactory, may be noted as an important item of saving for the consideration of a provident manufacturer?—Undoubtedly. Another consideration for the master is the fact that such workmen, the most idle and dissolute, are the most discontented, and are always the foremost in mischievous strikes and combinations.

"You have spoken of the consequences of making the public-house a place of payment; what are the comparative effects of making the payments at the counting-house? — A considerable reduction of the evil. Payments to large numbers at the counting-house is still, however, attended with much inconvenience and evil. The payment of the number of men employed at our works (between five and six hundred), would, as I have stated, occupy between two and three hours. This mode of payment, therefore, implies the keeping of a large crowd together during that time. During that time appointments are made of meetings at public-houses to drink, that would not otherwise take place. It also generates discontent; it gives an opportunity, by assembling a crowd, for any discontented or mischievous person to operate upon a large mass of people. Formerly the business of my manufactory, and the welfare of the working people, were very seriously interrupted by strikes; and I could not help observing the facilities which such meetings gave to such mischievous persons.

"What is the mode of payment which you have adopted? — I send the pay clerk into each room in the manufactory im-

mediately after the dinner hour, and he pays each man individually. Each man is scarcely taken from his work half a minute. I may observe that some masters, to save themselves trouble, so as to avoid the inconvenience of getting small change, will pay several men together. This again leads to the public-house, where the men commonly go to get change to divide the money amongst them; I therefore avoid paying any two men together, and subjecting them to temptation as well as to inconvenience and cost. Each of my workmen being paid in the shop, without the loss of a minute, may go at once directly home at the time when the work closes. He is thus afforded an opportunity of going at once to the market at an early hour, and is subjected to no factitious inducements to drink, disorder, improvidence, and destitution.

"What is the average time thus saved to each of the 550 workmen in your manufactory as compared with the more ordinary mode of payment? — About an hour and a half, or half the three hours of payment.

"Then, by this means, instead of bringing 550 persons to the one person, the pay clerk, sending that one person to the 550 persons, you save to them upwards of 800 hours of inconvenient waiting? — Just so.

"How many persons, on the average, have you absent from work on the Monday morning?—Not more than from four to five, until eight o'clock in the morning; and on the return to work after dinner from one to two persons.

"That is from one to two persons the entire day during the Monday, out of between five and six hundred workpeople? — Yes.

"What number would have been absent on the Monday under the ordinary circumstances? — About 50 per cent., or one third, would be drunk on the Saturday night; and full 10 per cent. would not make their appearance until the Tuesday morning. Instead of only two absent during the whole of the day, I should have more than fifty; or, in other words, more than fifty families not only distressed by what is spent in drink, but losing one sixth of their earnings, and I as a master losing by their deteriorated work when they do return. I beg leave further to observe, that mere education in reading or writing, precepts or preaching, are of very little avail against the temptations to drink held out to working men; and I am confident that if employers could be made to see and attend to their mutual interests, by a little care in the removal of temptations, they might generally prevent the most fruitful cause of disorder, destitution, and pauperism, at least as extensively as I have prevented those consequences to my workmen and their families by the adoption of the means I have described."

Dress and Personal Appearance. — Mr. W. Fairbairn says on this head: — "It is always an indication of looseness of character, and a low standard of moral conduct, to see a mechanic in dirt or in his working clothes on Sunday. Thirty years' experience leads me to draw a very unfavourable conclusion as to the future usefulness to me, and of success to himself, of any workman whom I see in dirt on a Sunday.

"As a general rule, does the advance of his house keep pace with the advance in condition of the person? — As a general rule, it does. Better personal condition leads to better associates, and commonly to better marriage, on which the improved condition of the house is entirely dependent. It is due to the labouring classes of females in Lancashire and the surrounding districts to state, that, in the important household virtue of cleanliness, they are superior to the females of the same class in Scotland.

"Are you aware of what is the condition of their houses: have you visited them? — I have not made it a practice to visit them. I chiefly judge of their circumstances from seeing them with their wives and families, and their well-dressed and respectable condition on the Sundays. These externals are always indications of greater comforts and respectability at home. I am a strong advocate for dress, and encourage the working men to dress well; if I see any workman in a dirty condition, and in his working clothes in the streets on the Sunday, I do not, perhaps, speak to him then, but on the Monday I tell him that I have been looking over the books, that I find that he has had as good wages as other men who dress respectably, and that I do not like to have any one about me who will not dress well on the Sunday. This intimation has generally had the desired effect."

The following brief notice of the factory which Mr. W. Fairbairn manages with so much judgment and ability (extracted from Love's "Hand Book of Manchester") may not be here out of place: —

"The establishment is situate in Canal Street, Great Ancoats Street. Here the *heaviest* description of machinery is manufactured, including steam-engines, water-wheels, locomotive engines, and mill-gearing. There are from 550 to 600 hands employed in the various departments; and a walk through the extensive premises, in which this great number of men are busily at work, affords a specimen of industry and an example of practical science which can scarcely be surpassed. In every direction of the works the utmost *system* prevails, and each mechanic appears to have his peculiar description of work assigned with the utmost economical subdivision of labour. All is activity, yet without confusion. Smiths, strikers, moulders, millwrights, mechanics, boiler-makers, pattern-makers, appear to attend to their respective employments with as much regularity as the working of the machinery they assist to construct.

"In one department mechanics are em-

ployed in building steam-engines — those mighty engines which have augmented so immensely the manufacturing interests of Great Britain. All sizes and dimensions are frequently under hand, from the diminutive size of 8 horses' power, to the enormous magnitude of 400 horses' power. One of this latter size contains the vast amount of 200 tons or upwards of metal, and is worth in round numbers from 5000*l.* to 6000*l.*

"The process of casting metal is conducted here on a very large scale. Castings 12 tons weight are by no means uncommon: the beam of a 300 horse-power steam-engine weighs that amount. Fly-wheels for engines and water-wheels, though not cast entire, are immense specimens of heavy castings. A fly-wheel for an engine of 100 horse-power measures in diameter 26 feet, and weighs about 35 tons. In this establishment some of the largest water-wheels ever manufactured, and the heaviest mill-geering have been constructed; one water-wheel, for instance, measuring 62 feet in diameter. The average weekly consumption of metal in these works in the process of manufacturing, owing to the quantity of wrought iron used, and the immense bulk of the castings, is 60 tons and upwards, or 3120 tons annually.

"The preparation of patterns—wood facsimiles of the castings — is a very costly process. Every piece of machinery, before it can be cast, must be constructed in wood; and these *patterns*, as they are termed, are made to form, in sand, the mould into which the liquid ore is poured. Fifty men are daily employed in making patterns. The patterns, which are part of the proprietors' *stock in trade*, are worth many thousand pounds. After being used, the most important are painted and varnished, and laid carefully aside in a dry room, to be ready for use when machines may accidentally get broken, or to aid in the construction of new ones. The patterns are made frequently of mahogany.

"A most curious machine is employed for the purpose of *planing iron*; and by means of its aid iron shavings are stripped off a solid mass of metal with apparently as much ease as if it were wood, and with the greatest regularity and exactness.

"Not the least interesting department of these works is that appropriated to boiler-making. Boilers for steam-engines are composed of a number of plates of wrought iron, of about 3-8ths of an inch in thickness. They are riveted together with rivets about 3-4ths of an inch diameter, holes to receive which are punched through the plates by a powerful yet simple machine with as much facility as if the resistance were mere air.

"This extensive concern forwards its manufactures to all parts of the world. The stranger is told on enquiry that *this* article is for Calcutta, *that* for the West Indies; this for St. Petersburgh, that for New South Wales; and there are besides men belonging to it *located* in various parts of Europe, who are employed under the direction of Mr. Fairbairn in superintending the erection of work manufactured on these premises.

"Many of the hands employed receive from 2*l.* to 3*l.* weekly wages; and scarcely any, except common labourers, receive less than 25*s.* per week. From these facts some idea of the capital necessary to conduct a concern of this description may be imagined."

STATE OF LABOUR IN THE COAL, IRON, TIN, COPPER, LEAD AND ZINC MINES OF GREAT BRITAIN AND IRELAND;

AND IN THE SURFACE WORKS FOR REDUCING THE ORES OF THESE METALS.

[*Compiled from the First Report of the Children's Employment Commission*, 1842.]

I.—Coal Mines.

The "Coal Measures," as the geological formations comprising the strata of coal are designated, are variously dispersed in the midland, northern, and western portions of South Britain, and in a broad belt of country which traverses the centre of Scotland, from the shores of Ayrshire to those of the Frith of Forth.

The most important of the English midland coal tracts, or coal fields, is that of South Staffordshire, which, lying to the west and north of Birmingham, is remarkable for the extent to which its vast beds are worked, as well for the purpose of smelting the iron ores, which are raised from strata interspersed among the coal strata, as for the consumption of the neighbouring populous towns, which are the seat of the metal manufactures, and for an extensive "land sale," as the supply of the surrounding country with fuel is frequently designated; the country southward, where canals extend, as far as the Thames, being in great part supplied from this region. The Shropshire district of Coalbrook Dale, lying midway between Wolverhampton and Shrewsbury, though much smaller in extent, is, in like manner, the seat of great iron-works, and is the source of a supply of fuel for a great part of the vale of the Severn, and the country to the west of it, to the borders of Wales. The Warwickshire coal field occupies a large tract on the north-eastern verge of that county, from Coventry to Tamworth; and the Leicestershire coal field surrounds the town of Ashby-de-la-Zouch. The coal of the latter is far more extensively wrought than that of the Warwickshire field; but both being without iron furnaces, their produce is required only for the

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land sale, which extends southward even through Buckinghamshire to the Thames.

In North Staffordshire, besides the coal field of the potteries, in which there are extensive iron-works at Kidsgrew, there is a smaller tract contiguous to the town of Cheadle. The consumption of the produce of both, however, extends little beyond the northern parts of that county.

In the vale of the Trent, between Nottingham and Derby, commences the great coal field of Derbyshire and Yorkshire, which extends hence northward, and of which the southern, or Derbyshire portion, occupies the eastern side of that county, and extends at one extremity into Nottinghamshire. Besides supplying with fuel a vast surrounding region, especially to the east and south, in the counties of Leicester, Nottingham, and Lincoln, it has a considerable home consumption in iron-works. The northern, or Yorkshire portion, which is wholly comprised in the West Riding, has extensive iron-works, and supplies with fuel the whole of Yorkshire, except the coast, and even makes some shipments down the Humber for London.

On the opposite side of the mountains which enclose Yorkshire on the west are the great coal-fields of Lancashire, extending southward into the eastern part of Cheshire, and worked to an enormous extent for the supply of the manufactures and the manufacturing and commercial population which has congregated in their neighbourhood and upon their surface, although there is no manufacture of iron native ores.

North of this is the Cumberland coal field, in which likewise the pits are wrought only for sale, to supply the counties of Cumberland and Westmoreland, and for shipment, chiefly at Whitehaven, to Ireland and the opposite shores of Scotland.

Again, crossing the mountains to the eastern side of the island, we find a large portion of the counties of Durham and Northumberland occupied by the coal tract, which, of all the districts having pits wrought almost wholly for sale, and only to a very small extent for the manufacture of metals, is by far the most important. It supplies not only the whole of those counties, the North Riding of Yorkshire, and the contiguous Scottish counties, but the whole of the eastern and southern coasts of England as far as Cornwall, including the metropolis itself, and the great south-eastern region, into which the sales of the inland coal districts do not penetrate, because of the greater cost of land carriage and the want of canals. The export to foreign parts is likewise very extensive; and the whole region is so important as to have rendered necessary, for the purposes of investigation, its division into two districts; that of South Durham, south of the river Wear, and that of North Durham and Northumberland, comprising the rest of the field.

The Coal Districts of the east of Scotland encircle the Frith of Forth in tracts of very irregular form, occupying large portions of the counties of East Lothian, Mid Lothian, and West Lothian, of Stirlingshire, and part of Dumbartonshire, of Clackmannanshire and Perthshire; and of Fifeshire, in the districts of Dunfermline, Kirkaldy, Cupar, and St. Andrew's; the coal of the whole of these districts is extensively wrought, chiefly for land sale to Edinburgh and the surrounding counties, though partly for shipment coastwise, and for the celebrated iron-works of the Carron Company in Stirlingshire.

Lanarkshire, Ayrshire, and Renfrewshire comprise nearly the whole of the irregularly scattered coal fields of the west of Scotland, and their mines have been chiefly wrought, like those of Lancashire, for the supply of the manufacturers, and of the great manufacturing and commercial population which have seated themselves upon their surface, or in their vicinity, with Glasgow for a centre; but of late years the district of Airdrie, to the east and south-east of Glasgow, has so rapidly extended its importance in the manufacture of iron from the excellent ores there found, as greatly to have augmented the working of its coal for that purpose also.

Returning southward, we find, on the eastern border of North Wales, in the counties of Denbigh and Flint, where they border upon Cheshire, a large coal field, heretofore possessed of considerable iron-works, which, however, seem now to be sinking before the competition of those in the west of Scotland, and other districts: it still, however, supplies with fuel nearly the whole of North Wales, and a large portion of Cheshire and Shropshire.

But the greatest coal-basin of the West is that of South Wales, which, commencing in the politically English county of Monmouth, occupies a considerable portion also of the counties of Glamorgan, Carmarthen, and Pembroke. The internal consumption of its coal in the manufacture of its native ores of iron, and of those of copper and tin brought from Cornwall and other parts, is enormous; and besides supplying with fuel the whole of South Wales and its borders, Cornwall, and a considerable part of Somersetshire, it exports large quantities of stone-coal, even to London.

The Forest of Dean is a singular detached coal field in Gloucestershire, between the confluent rivers Wye and Severn, in which pits are wrought for the manufacture of its excellent iron ores, and for the supply not only of the contiguous parts of Herefordshire and Gloucestershire, but also for a considerable land sale eastward towards Oxford. South Gloucestershire is, in great part, occupied by a coal field which extends northward from Bristol, and supplies that city and the contiguous country with fuel.

It is for a similar land sale that the

valuable mines of north Somersetshire, on the other side of the Avon, are wrought; the principal being those to the south-west of Bath, which not only supply the contiguous country, but have an extensive sale eastward in Wiltshire and Berkshire.

Of the comparatively unimportant coal fields of Ireland, the principal are those of Castlecomer in Kilkenny and the Queen's County, where pits are worked for country sale by three proprietors; that near Killenaule, in the county of Tipperary, where there are three pits worked by the Mining Company of Ireland; and that of Dromagh and Dysart, in the county of Cork, where there are pits worked by Messrs. Leader. There are also a few pits at Drumglass and Coal Island, in the county of Tyrone, which, with the Arigna coal pits at the northern extremity of Roscommon, supplying some contiguous iron works, complete the list of the Irish coal mines which are now worked.

From a great mass of evidence collected, respecting the practices of these various collieries, the Commissioners have been led to the following conclusions:—

1. That instances occur in which children are taken into these mines to work as early as four years of age, sometimes at five, and between five and six, not unfrequently between six and seven, and often from seven to eight, while from eight to nine is the ordinary age at which employment in these mines commences.

2. That a very large proportion of the persons employed in carrying on the work of these mines is under thirteen years of age; and a still larger proportion between thirteen and eighteen.

3. That in several districts female children begin to work in these mines at the same early ages as the males.

4. That the great body of the children and young persons employed in these mines are of the families of the adult workpeople engaged in the pits, or belong to the poorest population in the neighbourhood, and are hired and paid in some districts by the workpeople, but in others by the proprietors or contractors.

5. That there are in some districts also a small number of parish apprentices who are bound to serve their masters until twenty-one years of age, in an employment in which there is nothing deserving the name of skill to be acquired, under circumstances of frequent ill-treatment, and under the oppressive condition that they shall receive only food and clothing, while their free companions may be obtaining a man's wages.

6. That in many instances much that skill and capital can effect to render the place of work unoppressive, healthy, and safe, is done, often with complete success, as far as regards the healthfulness and comfort of the mines; but that to render them perfectly safe does not appear to be practicable by any means yet known; while in great numbers of instances their condition in regard both to ventilation and drainage is lamentably defective.

7. That the nature of the employment which is assigned to the youngest children, generally that of "trapping," requires that they should be in the pit as soon as the work of the day commences, and according to the present system that they should not leave the pit before the work of the day is at an end.

8. That although this employment scarcely deserves the name of labour, yet, as the children engaged in it are commonly excluded from light, and are always without companions, it would, were it not for the passing and repassing of the coal carriages, amount to solitary confinement of the worst order.

9. That in those districts in which the seams of coal are so thick that horses go direct to the workings, or in which the side passages from the workings to the horseways are not of any great length, the lights in the main ways render the situation of these children comparatively less cheerless, dull, and stupifying; but that in some districts they remain in solitude and darkness during the whole time they are in the pit, and, according to their own account, many of them never see the light of day for weeks together during the greater part of the winter season, excepting on those days in the week when work is not going on, and on the Sundays.

10. That at different ages, from six years old and upwards, the hard work of pushing and dragging the carriages of coal from the workings to the main ways, or to the foot of the shaft, begins; a labour which all classes of witnesses concur in stating requires the unremitting exertion of all the physical power which the young workers possess.

11. That, in the districts in which females are taken down into the coal mines, both sexes are employed together in precisely the same kind of labour, and work for the same number of hours; that the girls and boys, and the young men and young women, and even married women and women with child, commonly work almost naked, and the men, in many mines, quite naked; and that all classes of witnesses bear testimony to the demoralizing influence of the employment of females underground.

12. That, in the east of Scotland, a much larger proportion of children and young persons are employed in these mines than in other districts, many of whom are girls; and that the chief part of their labour consists in carrying the coals on their backs up steep ladders.

13. That when the workpeople are in full employment, the regular hours of work for children and young persons are rarely less than eleven; more often they are twelve; in some districts they are thirteen: and in one district they are generally fourteen and upwards.

14. That in the great majority of these mines night-work is a part of the ordinary

system of labour, more or less regularly carried on according to the demand for coals, and one which the whole body of evidence shows to act most injuriously both on the physical and moral condition of the workpeople, and more especially on that of the children and young persons.

15. That the labour performed daily for this number of hours, though it cannot strictly be said to be continuous, because, from the nature of the employment, intervals of a few minutes necessarily occur during which the muscles are not in active exertion, is nevertheless generally uninterrupted by any regular time set apart for rest and refreshment; what food is taken in the pit being eaten as best it may while the labour continues.

16. That in well-regulated mines, in which in general the hours of work are the shortest, and in some few of which from half an hour to an hour is regularly set apart for meals, little or no fatigue is complained of after an ordinary day's work, when the children are ten years old and upwards; but in other instances great complaint is made of the feeling of fatigue, and the workpeople are never without this feeling, often in an extremely painful degree.

17. That in many cases the children and young persons have little cause to complain in regard to the treatment they receive from the persons in authority in the mine, or from the colliers; but that in general the younger children are roughly used by their older companions; while in many mines the conduct of the adult colliers to the children and young persons who assist them, is harsh and cruel; the persons in authority in these mines, who must be cognizant of this ill-usage, never interfering to prevent it, and some of them distinctly stating that they do not conceive that they have any right to do so.

18. That, with some exceptions, little interest is taken by the coal owners in the children and young persons employed in their works, after the daily labour is over; at least little is done to afford them the means of enjoying innocent amusement and healthful recreation.

19. That in all coal fields accidents of a fearful nature are extremely frequent; and that the returns made to our own queries, as well as the registry tables, prove that of the workpeople who perish by such accidents, the proportion of children and young persons sometimes equals and rarely falls much below that of adults.

20. That one of the most frequent causes of accidents in these mines is the want of superintendence, by overlookers or otherwise, to see to the security of the machinery for letting down and bringing up the workpeople, the restriction of the number of persons that ascend and descend at a time, the state of the mine as to the quantity of noxious gas in it, the efficiency of the ventilation, the exactness with which the air-door keepers perform their duty, the places into which it is safe or unsafe to go with a naked lighted candle, and the security of the proppings to uphold the roof, &c.

21. That another frequent cause of fatal accidents in coal mines is the almost universal practice of intrusting the closing of the air-doors to very young children.

22. That there are many mines in which the most ordinary precautions to guard against accidents are neglected, and in which no money appears to be expended with a view to secure the safety, much less the comfort, of the workpeople.

23. That there are moreover two practices peculiar to a few districts which deserve the highest reprobation; namely, first, the practice, not unknown in some of the smaller mines in Yorkshire, and common in Lancashire, of employing ropes that are unsafe for letting down and drawing up the workpeople; and, second, the practice, occasionally met with in Yorkshire, and common in Derbyshire and Lancashire, of employing boys at the steam-engines for letting down and drawing up the workpeople.

24. That in general the children and young persons who work in these mines have sufficient food, and, when above ground, decent and comfortable clothing—their usually high rate of wages securing to them these advantages; but in many cases, more especially in some parts of Yorkshire, in Derbyshire, in South Gloucestershire, and very generally in the east of Scotland, the food is poor in quality, and insufficient in quantity; the children themselves say that they have not enough to eat; and the Sub-Commissioners describe them as covered with rags, and state that the common excuse they make for confining themselves to their homes on the Sundays, instead of taking recreation in the fresh air, or attending a place of worship, is that they have no clothes to go in; so that in these cases, notwithstanding the intense labour performed by these children, they do not procure even sufficient food and raiment: in general, however, the children who are in this unhappy case are the children of idle and dissolute parents, who spend the hard-earned wages of their offspring in the public-house.

25. That the employment in these mines commonly produces, in the first instance, an extraordinary degree of muscular developement, accompanied by a corresponding degree of muscular strength: this preternatural developement and strength being acquired at the expense of the other organs, as is shown by the general stunted growth of the body.

26. That partly by the severity of the labour and the long hours of work, and partly through the unhealthy state of the place of work, this employment, as at present carried on in all the districts, deteriorates the physical constitution; in the thin-seam mines, more especially, the limbs become crippled and the body distorted; and in general the muscular powers give way, and

the workpeople are incapable of following their occupation, at an earlier period of life than is common in other branches of industry.

27. That by the same causes the seeds of painful and mortal diseases are very often sown in childhood and youth; these, slowly but steadily developing themselves, assume a formidable character between the ages of thirty and forty; and each generation of this class of the population is commonly extinct soon after fifty.

The commissioners have, notwithstanding the preceding conclusions, felt bound to report upon the whole:

"1st, That the coal mine, when properly ventilated and drained, and when both the main and the side passages are of tolerable height, is not only not unhealthy, but, the temperature being moderate and very uniform, it is, considered as a place of work, more salubrious and even agreeable than that in which many kinds of labour are carried on above ground.

"2d, That the labour in which children and young persons are chiefly employed in coal-mines, namely, in pushing the loaded carriages of coals from the workings to the mainways or to the foot of the shaft, so far from being in itself an unhealthy employment, is a description of exercise which, while it greatly developes the muscles of the arms, shoulders, chest, back, and legs, without confining any part of the body in an unnatural and constrained posture, might, but for the abuse of it, afford an equally healthful excitement to all the other organs; the physical injuries produced by it, as it is at present carried on, independently of those which are caused by imperfect ventilation and drainage, being chiefly attributable to the early age at which it commences, and to the length of time during which it is continued."

When we consider the extent of this branch of industry, the vast amount of capital embarked in it, and the intimate connection in which it stands with almost all the other great branches of our trade and manufacture, these conclusions are of a very consoling and satisfactory character.

One intolerable case there is, however, for which the Commissioners seem to admit there is no remedy but entire abolition.

By the evidence collected under this Commission, it is proved that there are coal mines at present in work in which the passages are so small, that even the youngest children cannot move along them without crawling on their hands and feet, in which unnatural and constrained posture they drag the loaded carriages after them; and yet, as it is impossible, by any outlay compatible with a profitable return, to render such coal mines, happily not numerous nor of great extent, fit for human beings to work in, they never will be placed in such a condition, and consequently they never can be worked without inflicting great and irreparable injury on the health of the children.

II. — Iron Mines and Works.

The characteristic differences between the ironstone mines and the coal mines, as far as those differences influence the manner of working the former, are chiefly these:—

In the ironstone mines the beds are, for the most part, thin, generally from two to three feet, a little more or less. In many of these pits the ore is in thin bands of two or three inches in width, and very often two thin beds lie near each other, with a substratum of indurated clay beneath them. The miners have only the space between the bands to work in; or if they clear away some space more, it is the smallest possible, on account of the expense. The ironstone found in the form of rounded boulders is distributed through strata of clay, or of clay and sand; and in this case more room is usually afforded for work.

The Commissioners report with regard to labour in these mines—

That on account of the greater weight of the material to be removed, the labour in those mines, which are worked on a system similar to that of the coal mines, is still more severe than that in the latter, and renders the employment of older and stronger children a matter of absolute necessity; while the ironstone pits are in general less perfectly ventilated and drained than the coal mines, and are, therefore, still more unhealthy, producing the same physical deterioration and the same diseases, but in a more intense degree.

And in regard to the blast furnaces for reducing the ores of iron, they find—

That the operations connected with these works involve the absolute necessity of night work; that children and young persons invariably work at night with the adults; that the universal practice is for one set of workpeople to work one week during the day, and the same set to work the following week during the night; and that there is, moreover, in addition to the evil of alternate weeks of night work, a custom bearing with extreme hardship upon children and young persons, namely, that of continuing the work without any interruption whatever during the Sunday, and thus rendering every alternate Sunday the day during which the labour of one set of workpeople is continued for twenty-four hours in succession; a custom which still prevails, notwithstanding that a considerable proportion of the proprietors have dispensed with the attendance of the workpeople during a certain number of hours on the Sunday, without disadvantage to their works.

The necessity of Sunday labour to a large extent at the blast furnaces, is thus explained by Mr. Lane, one of the superintendants of the Colebrook Dale Company.

For these twelve years past the furnaces have stood six hours on the Sundays, and sometimes a little longer. No injury arises if the furnace be at the time in a good working state; but if not in a good working state, or if it was to stand too long, the

ron would be thick and hard, and would fall into the hearth and set; that is, it would congeal and pass from a fluid into a solid state, and, consequently, when the time came for tapping the furnace to let out the melted iron, it would be necessary to make the opening higher up to let out the fluid iron, and it would be, perhaps, three weeks before all the congealed iron came off by little and little, and cleared the furnace. If the furnace were to stand for ten or twelve hours, at the end of that time it would not be in so good a state, it would not make so good iron, and it would be at greater expense; there would be more fuel consumed, and there would be more labour and less iron, and that not so good in quality. When an accident happened by which the furnace was stopped twenty-four hours, it was from a week to nine days before the furnace was set right.... Has known a case where, from an accident, the furnace has stopped eight hours, the furnace was not in good working order after it commenced, and it was not right until the third day. He has frequently known the furnaces in worse condition from stopping the usual six hours on Sundays.

III. — Tin, Copper, Lead, and Zinc Mines.

The employment of children and young persons in the mines of tin, copper, lead, and zinc, has little in common with their employment in mines of coal and iron, on account of the different physical circumstances in which the ores of these metals are found, and the peculiar operations required to separate them from the worthless materials with which they are combined.

Instead of forming beds more or less horizontal, and in regular alternation with strata of which the material is for the most part readily removed by the tools of the workmen, these ores are found in veins which variously approach a vertical position, in the hard rocks of the primary formations, or in the scarcely less solid lower beds of the carboniferous system.

The ores of tin are found only in the Cornish district, in granitic and slaty rocks, of various structure, which are interspersed occasionally with masses of trap, and extend from Dartmoor, in Devonshire, to the Land's End, in Cornwall. This district is also the most productive in copper ores of any in the British Islands, and contains, moreover, mines of manganese, of iron, and of lead, the ores of which latter often contain a portion of silver, which is worth extracting from the baser metal. Of the various mines of this district, those of tin, copper, and lead present the characteristic features of its mining labour, and employ at least nineteen-twentieths of the young people engaged in it. The ores here obtained are smelted chiefly in South Wales, being shipped to Swansea for the convenience of fuel; but in the other principal mining districts the ores are smelted near the place of their excavation.

The elevated district of mountain limestone, intermingled with various strata of gritstone and shale, which occupies the borders of Northumberland, Durham, and Cumberland, and of which Alston Moor may be considered as the capital, is the only other part of England in which metallic veins are now extensively wrought: these are exclusively of lead, containing a proportion of silver, which is commonly worth extracting. The veins in the mountain limestone of Derbyshire are now nearly exhausted.

In Wales, the Plinlimmon district, composed of various qualities of slate, was formerly much celebrated for its metallic products, but is now of inferior importance, and has not been subjected to any special investigation under the terms of the present commission. In the neighbourhood of Snowdon the scattered mines are also of inferior importance. But the mines in the mountain limestone of Flintshire present an important group of works, into which the inquiry has been extended.

In Scotland the principal metallic veins that have yet been worked are still those in the clay slate mountains in the neighbourhood of Leadhills, on the borders of Lanarkshire and Dumfriesshire, although trials are also making in various parts of Galloway, and one of them, at Carsephairn, is on a considerable scale.

In Ireland, in the slate and limestone rocks of the most mountainous districts, and generally near the sea-coast, there are scattered some mines of copper and lead, but chiefly of copper, for the most part in the counties of Wicklow, Wexford, Waterford, Cork, Kerry, Tipperary, Down, and Armagh.

Most of the regions in which the metallic veins occur, are thus seen to be hilly or mountainous. The south-western and the Flintshire districts are the least elevated; the loftiest hills in the former rarely exceeding 1000 feet above the level of the sea, while the greater number of them range from 500 to 700, and the plains at their bases are in general but from 100 to 200 feet above high water. This circumstance materially affects the comfort of the children and young persons employed in working the mines.

With respect to the *under-ground* labour in these mines, the Commissioners report—

1. That very few children are employed in any kind of under-ground work in these mines before they are twelve years old, and that in many cases even the young men do not commence underground work until they are eighteen years of age and upwards.

2. That there is no instance in the whole kingdom of any girl or woman being employed in underground work in these mines.

3. That it is in the Cornish district alone that children and young persons of any age are constantly employed underground in considerable numbers.

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4. That, in general, the children and young persons employed in these mines have sufficient food, and decent and comfortable clothing.

5. That employment in these mines does not, in general, produce any apparent injury to the young worker during the period of boyhood and adolescence, but that his employment is essentially, and in every mode in which it has hitherto been carried on, necessarily injurious in after-life.

6. That the very general and early deterioration and failure of the health and strength of those who have followed this occupation from boyhood and youth, is increased by certain circumstances which are not necessarily connected with the nature of the employment; among these may be reckoned the practice, almost universal in these mines, of associating the young persons in partnership with the adult miners, by which the former are stimulated to exertions greatly beyond their age and powers; and though these young people, thus excited, work with spirit, and without apparent injury, for some time, yet in a few years it is proved by experience that they have expended the whole capital of their constitution.

7. That this result is materially hastened by the fatigue of climbing the ladders; these being, with few exceptions, the only means by which the miners can go to and return from their places of work.

8. That these, however, are only the accessory causes of the general and rapid deterioration of the health and strength of the miners; since the primary and ever active agent which principally produces this result is the noxious air of the places in which the work is carried on; the difficulties connected with the purification and renovation of this air, and with the whole subject of ventilation, being incomparably greater in the mines in question than in coal mines.

9. That the ultimate effect of the disadvantageous circumstances under which the miner is obliged to pursue his laborious occupation, is the production of certain diseases (seated chiefly in the organs of respiration), by which he is rendered incapable of following his work, and by which his existence is terminated at an earlier period than is common in other branches of industry, not excepting even that of the collier.

With regard to the *surface* employments connected with dressing the ores of tin, copper, lead, and zinc, the Commissioners find—

That these employments, though entered into at very early ages, and in the Cornish district by great numbers of girls as well as boys, are wholly free from the evils connected with the underground work; that, with the exception of a very injurious exposure to the inclemency of the weather, which might be obviated by a small expenditure in providing shelter, and with the exception of two or three occupations, such as those of "bucking" and "jigging," for the manual labour of which the substitution of machinery is gradually taking place, there is nothing in this branch of mining industry injurious, oppressive, or incompatible with the maintenance even of robust health, which indeed is described as the general condition of the workpeople; the children and young persons thus employed having commonly sufficient food, and warm and decent clothing, being subjected to no harsh or tyrannical treatment, and enjoying an almost complete immunity from any serious danger.

Dr. Barham, one of the Sub-Commissioners, states that an experiment of lowering and raising the miners by machinery has lately been, for the first time, made in Cornwall, at the great copper mine Tresavean, in Gwennap. The method adopted has been very little varied from that long in use in the mines in the Hartz in Germany, being that of two parallel rods, with stages projecting from them at intervals of about 12 feet, of a convenient size for one man to stand upon. One rod being made to descend while the other ascends, the miner steps from his stage or platform on one rod to that which he finds opposite to it on the other rod, and by this alternate change he is conveyed up or down the shaft without any other exertion. The moving power to which the rods are attached is at present a water-wheel. This experiment, which has been perfectly successful, has been carried into effect by the spirited and benevolent exertions of the principal lords and adventurers of Tresavean, stimulated and aided by the Royal Polytechnic Society of Cornwall.

The Commissioners reserve for a future Report the subject of Tin Works; but report, with respect to the others, that in smelting the ores of lead, near the places at which they are raised, no children, and very few young persons, are engaged, but that in the copper works of South Wales, in which the Cornish ores are smelted, and in those of North Wales, which reduce the ores raised in the vicinity, a number of children and young persons are employed, from nine years of age and upwards (in South Wales girls as well as boys), of whom those engaged at the calcining furnaces regularly work with the men twenty-four hours consecutively, or alternate days, without excepting the Sunday, a term of work which is sometimes extended to thirty-six hours, and even to forty-eight hours, when, as in South Wales, the "long watch" includes the Sunday.

The Sub-Commissioner who reports on the South Staffordshire and Shropshire districts is of opinion that there is no necessity whatever for working the calcining furnaces on Sundays.

"At many works all the furnaces, including the calciners, are on Sundays suspended from *active operations*, and simply kept on 'deadfire,' as it is termed, attended only by watchmen, one of whom

generally serves two or more of such fires, until the hands resume their regular work on the Sunday night or Monday morning. In my own opinion very little is actually required to be done on Sunday in order to keep the copper-works in action, and none, of necessity, on the parts of children, young persons, or females."

Since the Report was made to Parliament, of which the preceding is an abstract, Lord Ashley, whose labours in the cause of humanity, in this as well as other instances, do him infinite honour, was the means of procuring an Act to be passed (5 & 6 Vict. cap. 99., Aug. 10. 1842), by which the following salutary changes have been made in the state of the labouring population employed in our Mines and Collieries:—

1. It is henceforth unlawful for any owner of any mine or colliery whatsoever to employ any female person within any mine or colliery, or permit any female person to work or be therein, for the purpose of working therein, other than such as were at or before the passing of this Act employed within such mine or colliery; and from and after the 10th of Nov., 1842, it is to be unlawful for any owner of any mine or colliery to employ any female person who at the passing of this Act, was under the age of eighteen years, within any mine or colliery, or permit such person to work or be therein. Any indenture of apprenticeship, whereby any female person who at the passing of this Act was under the age of eighteen years shall be bound to work or liable to be called on to work in any mine or colliery is, after the 10th of Nov. 1842, to be absolutely void; and from and after the 1st of March, 1843, it is not to be lawful for any owner of any mine or colliery to employ any female person whatsoever within any mine or colliery, or to allow or permit any female person to work or be therein; and every indenture of apprenticeship, or other contract or engagement, whereby any female person whatsoever shall be bound to work or be liable to be called on to work within any mine or colliery (other than such as are before declared to be void after the 10th of November, 1842), are, from and after the said 1st of March, 1843, to be absolutely void.

2. From and after the 1st of March, 1843, males are not to be employed in mines or collieries under ten years of age, "other than such as at the passing of the Act had attained the age of nine years, and were, at or before the passing of the Act, employed within such mine or colliery."

3. From the date of the Act no person is to be apprenticed under ten of years, nor for longer than eight years, and indentures contrary to the Act to be void.

4. When any person who is now serving under articles of apprenticeship within any mine or colliery shall attain the age of eighteen, he is to be discharged from such apprenticeship, and the articles of apprenticeship to become absolutely null and void.

5. Persons offending against any of the preceding provisions, are to forfeit a sum not more than 10*l.* nor less than 5*l.*

6. Parents or guardians misrepresenting ages of persons employed, to forfeit a sum not exceeding 40*s.*

7. Where there is any entrance to a mine or colliery by means of a vertical shaft, or pit, or inclined plane, or where there is any communication within any part of a mine or colliery to any other part thereof by a vertical shaft or pit or inclined plane, then it is not to be lawful for any owner to allow any person or persons other than a male of the age of fifteen years and upwards to have charge of any steam engine or other engine, windlass, or gin, (whether driven or worked by manual labour, or any other power whatsoever,) or to have charge of any part of the machinery, ropes, chains, or other tackle of any such engine, by or by means of which engine, machinery, ropes, chains, or other tackle persons are brought up or passed down any such vertical shaft or pit or inclined plane; any person or persons offending to forfeit a sum not exceeding 50*l.* nor less than 20*l.*

8. In the case of a windlass or gin worked by a horse or other animal, the person on the bank under whose direction the driver of the animal used for such windlass or gin shall act, is, for the purposes of the act, to be deemed and taken to be the person having the charge thereof.

9. From and after the 10th of November, 1842, no proprietor or worker of any mine or colliery, or other person, is to pay or cause to be paid any wages at or within any tavern, public house, beer shop, or other house of entertainment, or any office, garden, or place belonging thereto or occupied therewith. Penalty not exceeding 10*l.* nor less than 5*l.*

10. Wages so paid are to be recoverable, as if not paid.

LAW FOR REGULATING THE WEIGHT AND QUALITY OF BREAD.

By the 6 & 7 W. IV. cap. 37. (1836), all the then existing statutes on the subject of the sale of bread were repealed, and one uniform law for the whole kingdom was established, of which the following are the principal heads:—1. Bread may be made and sold of such weight and size as the bakers or sellers shall think fit. But, 2. Bread shall be sold by weight only, under the penalty of 40*s.* for every offence. (Thus peck loaves and other measure loaves are prohibited.) But fancy bread and rolls

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are exempted from the necessity of being weighed. 3. The weight shall be only according to the avoirdupois standard of 16 ounces to the pound, and the several gradations of a pound for any less quantity than a pound; and for every deviation from such uniform weight the offender is liable to a penalty of 5*l*. 4. Every baker and seller of bread must have on or near the counter a beam and scales, with proper weights, in order that all bread sold be weighed in the presence of the purchaser, under the penalty of 5*l*. for each offence. 5. All bread carts are to have the like weighing apparatus, under the like penalty. 6. All adulteration of bread is punished with a penalty of 10*l*., and all loaves not made wholly of wheat must be marked with the letter "M," under a penalty of 10*l*. for each pound weight offered for sale.

Any person may prosecute for the penalties.

STANDARD WEIGHTS AND MEASURES.

A COMMISSION was some time ago appointed by government to institute a new inquiry into the present standard weights and measures, consisting of Sir John Herschell, Professor Airy, Mr. Lubbock, and others. The commissioners have reported, 1. That it would be advisable to adopt a decimal computation in all weights, measures, and monies; 2. That troy weight should be abolished, and avoirdupois substituted; and, 3. That proper model standards should be provided.

GAS-LIGHT TABLES.

I. TABLES of the different Quantities of Coal Gas, of the specific Gravity ·420, delivered in One Hour from horizontal Pipes of different Diameters and Lengths, and under different Pressures.

Quantities delivered by a Two-Inch Main in Cubic Feet.

Length of Pipe in Yards.	Pressure in Inches and Parts.			Perpendicular Head of Water.		
	0·50	0·75	1·00	1·50	2·00	3·00
10	2896	3558	4135	4923	5792	6950
20	2047	2507	2886	3541	4094	4994
40	1445	1770	2037	2490	2890	3525
100	915	1121	1290	1582	1830	2232
200	647	792	912	1119	1294	1578
400	457	559	644	790	914	1115
Quantities delivered by a Three-Inch Main in Cubic Feet.						
50	2911	3565	4014	5036	5822	7102
100	2059	2522	3303	3562	4118	5023
200	1456	1783	2052	2518	2912	3552
400	1029	1260	1450	1780	2058	2510
800	728	892	1026	1259	1456	1776
1760	490	600	690	847	980	1195
Quantities delivered by a Four-Inch Main in Cubic Feet.						
100	3660	4483	5160	6331	7320	8930
200	2589	3169	3670	4478	5178	6317
440	1755	2149	2474	3036	3510	4282
1760	872	1068	1229	1508	1744	2127
3520	617	755	869	1067	1234	1505
7040	431	528	607	745	862	1051
Quantities delivered by a Five-Inch Main in Cubic Feet.						
200	4047	4987	5724	7010	8095	9914
440	2729	3342	3959	4726	5457	6684
880	1979	2363	2729	3342	3959	4726
1760	1364	1671	1979	2368	2729	3342
3520	965	1181	1364	1671	1929	2363
7040	682	835	965	1931	1364	1671
10000	572	701	809	991	1145	1402
Quantities delivered by a Six-Inch Main in Cubic Feet.						
440	3929	4813	5557	6806	7858	9626
880	2778	3403	3929	4813	5557	6807
1760	1965	2406	2778	3403	3929	4813
3520	1389	1702	1965	2406	2778	3403
7040	982	1149	1389	1702	1965	2298
10000	824	1010	1166	1428	1648	2019

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Quantities delivered by a Seven-Inch Main in Cubic Feet.

Length of Pipe in Yards.	Pressure in Inches and Parts.			Perpendicular Head of Water.		
	0·50	0·75	1·00	1·50	2·00	3·00
440	5185	6350	7520	8979	10370	12700
880	3760	4490	5183	6350	7520	8979
1760	2592	3175	3760	4490	5183	6350
3520	1880	2244	2592	3175	3760	4488
7040	1296	1586	1880	2244	2592	3173
10000	1088	1322	1538	1884	2175	2644

Quantities delivered by an Eight-Inch Main in Cubic Feet.

440	6986	8556	9879	12100	13972	17112
880	4940	6050	6986	8556	9879	12100
1760	3493	4278	4940	6050	6986	8556
3520	2470	3025	3493	4278	4940	6050
7040	1746	2139	2470	3025	3493	4278
10000	1465	1795	2072	2538	2931	3589

Quantities delivered by a Ten-Inch Main in Cubic Feet.

440	10915	13368	15436	18965	21830	26736
880	7718	9453	10915	13368	15436	18905
1760	5458	6684	7718	9453	10915	13368
3520	3859	4726	5458	6684	7718	9453
7040	2729	3342	3859	4726	5458	6684
10000	2290	2804	3238	3966	4579	5608

Quantities delivered by a Twelve-Inch Main in Cubic Feet.

440	15716	19252	22228	27224	31452	38504
880	11112	13612	15716	19252	22228	27224
1760	7860	9624	11112	13612	15716	19252
3520	5556	6808	7860	9624	11112	13612
7040	3928	4596	5556	6808	7860	9624
10000	3297	4038	4663	5710	6594	8076

Quantities delivered by a Fourteen-Inch Main in Cubic Feet.

440	21394	26202	30256	37056	42788	52404
880	15128	18528	21394	26202	30256	37056
1760	10697	13101	15128	18528	21394	26202
3520	7564	9264	10697	13101	15128	18528
7040	5348	6550	7564	9264	10697	13101
10000	4488	5496	6346	7773	8975	10992

Quantities delivered by a Fifteen-Inch Main in Cubic Feet.

440	24538	30078	34745	42538	49116	60156
880	17365	21269	24588	30078	34730	42538
1760	12280	15039	17365	21269	24588	30078
3520	8683	10633	12280	15039	17365	21269
7040	6140	7519	8683	10633	12280	15039
10000	5151	6309	7285	8923	10303	12618

Quantities delivered by a Sixteen-Inch Main in Cubic Feet.

440	27944	34224	39520	48400	55888	68448
880	19760	24200	27944	34224	39520	48400
1760	13972	17112	19760	24200	27944	34224
3520	9880	12100	13972	17112	19760	24200
7040	6981	8556	9880	12100	13972	17112
10000	5861	7178	8289	10152	11722	14356

Quantities delivered by an Eighteen-Inch Main in Cubic Feet.

440	35361	43317	50004	61254	70722	86634
880	25002	30627	35361	43317	50004	61254
1760	17685	21658	25002	30627	35361	43317
3520	12500	15313	17685	21658	25002	30627
7040	8842	10830	12500	15313	17685	21658
10000	7418	9086	10490	12848	14836	18170

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From the preceding Tables, which are taken in a condensed form from a Treatise on the Manufacture and Distribution of Coal Gas, by Mr. Samuel Clegg, jun. (the best work which has yet appeared on the subject), it will be seen that the quantities of gas discharged at equal times and under equal pressures by horizontal pipes of different lengths, are nearly in the inverse ratio of the square roots of the lengths. The chief cause of this continual decrease is the friction of the pipes. Mr. Clegg estimates the loss from this cause, in a pipe a mile long, to be 44,116·8, where the actual velocity is 45.080.

In mains rising *above* the *horizontal* line, the quantity of gas delivered will be greater, and in mains that fall *below* that line, less than the numbers stated in the Table, because, in the former instance, the resistance offered to the flow of the gas by the atmospheric pressure is lessened, while in the latter it is increased. The pressure requisite for the discharge of the gas will also vary with the degree in which the pipes diverge in either way from a longitudinal line, in the proportion of about an inch head of water for every ten feet rise or fall.

The distribution of the flow of the gas from bends and angles in mains upon the quantities delivered, is found to be nearly as the number of bends, that is to say, two bends make twice the difference, three times three, and so on. It appears, from experiments made with a two-inch pipe, that a semicircular bend reduced the discharge of gas nearly 1-20th, a right-angled bend 1-39th, and a quadrant bend, 1-45.

II. TABLE of the Dimensions of Consumers' Meters.

Number of lights	5	10	20	30	50	80	100	150	200	400	800
Diameter of drums (in.)	$12\frac{1}{4}$	$14\frac{3}{4}$	$17\frac{1}{2}$	$19\frac{1}{2}$	$21\frac{1}{2}$	25	$27\frac{3}{4}$	33	33	44	60
Depth	5	$6\frac{3}{4}$	$9\frac{1}{2}$	$10\frac{7}{8}$	$11\frac{1}{2}$	$12\frac{3}{4}$	$13\frac{3}{4}$	$20\frac{1}{4}$	$24\frac{3}{4}$	$30\frac{3}{4}$	$40\frac{1}{4}$
Diameter of water circle	$3\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{2}$	5	5	$6\frac{1}{2}$	$7\frac{1}{2}$	9	10	15	21
Centre opening	$1\frac{3}{4}$	2	$2\frac{3}{4}$	3	$3\frac{1}{4}$	4	5	6	7	10	15
Hollow cover projects	$\frac{3}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{3}{4}$
Depth of inner hoods	$\frac{1}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	1	1	$1\frac{1}{2}$	2	3	5
Do. outlet	$\frac{3}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	4	$5\frac{1}{2}$
Capacity in cubic feet	·25	·50	1·00	1·50	2·00	3·00	4·00	8·00	10·00	20·00	50·00

III. TABLE of Prices of Station and Consumers' Meters.

Station Meters.	£	s.	d.	Consumers' Meters.	£	s.	d.
To measure.				3 lights	2	2	0
50,000 cubic ft. in 24 hours	50	0	0	5 do.	2	10	0
100,000 do.	100	0	0	10 do.	3	5	0
200,000 do.	150	0	0	20 do.	4	7	0
300,000 do.	190	0	0	30 do.	5	17	0
500,000 do.	300	0	0	50 do.	8	10	0
1,000,000 do.	500	0	0	100 do.	18	10	0

IV. TABLE of the Average Weights and Prices of Socket Pipes.

Diameter.	Thickness.	Length.		Weight.			Price per yard.		
Inches.	*In.*	*Ft.*	*In.*	*cwt.*	*qr.*	*lbs.*	*L.*	*s.*	*d.*
$1\frac{1}{2}$	$\frac{1}{4}$	4	6	0	0	25	0	1	6
2	"	6	0	0	1	9	0	1	8
3	$\frac{1}{4}$	6	0	0	3	4	0	2	7
4	$\frac{1}{2}$	9	0	1	1	11	0	3	8
5	"	"	"	1	2	23	0	5	3
6	"	"	"	2	0	2	0	7	0
8	$\frac{1}{2}$	"	"	3	2	4	0	10	8
9	"	"	"	4	0	5	0	12	3
10	$\frac{1}{2}$ full	"	"	4	2	20	0	14	4
12	"	"	"	6	2	10	0	17	6
14	"	"	"	9	1	6	1	1	0
15	"	"	"	9	3	18	1	3	6
16	"	"	"	10	2	0	1	6	0

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TABLES OF THE ANNUAL DIMINUTION FROM DEATHS AND INCREASE FROM BIRTHS IN THE POPULATION OF ENGLAND.

TABLE I.—Showing the proportional Number of Deaths and Births in each County of England, in the Year ended June 30. 1840.

Counties.	Deaths, one in every	Births, one for every	Counties.	Deaths, one in every	Births, one for every	Counties.	Deaths, one in every	Births, one for every
Hereford	64	45	Norfolk	51	34	Bedford	44	26
Dorset	61	34	Cumberland	51	35	Northumberld.	44	29
Cornwall	59	30	Gloucester	51	37	Westmoreland	43	35
Devon	58	36	Salop	50	37	York, E. R.	43	34
Sussex	55	34	Oxford	50	32	Durham	43	28
Southampton	55	37	Hertford	49	29	York, W. R.	43	27
Essex	53	35	Kent	48	35	Chester	43	34
Wilts	53	35	Somerset	48	33	Berks	42	28
York, N. R.	53	38	Derby	47	35	Middlesex	42	35
Rutland	53	30	Northampton	47	29	Leicester	40	29
Suffolk	53	32	Warwick	47	31	Monmouth	38	26
Bucks	52	33	Hants	46	28	Nottingham	36	28
Lincoln	52	31	Cambridge	45	28	Worcester	33	20
Stafford	51	31	Surrey	45	33	Lancaster	32	26

TABLE II. — Showing the average Rates of Diminution from Deaths and of Increase from Births in the Counties of England, divided into Districts of Fourteen Counties each, in the order in which they stand in Table I.

	The Annual Average Rate of Increase of Population has been, per 10,000 Persons between 1831 and 1841.	Proportion of Births and Deaths to Population in the Year ended 30th June, 1840.	Proportion of Births and Deaths to every 10,000 Persons in the Year ended 30th June, 1840.	Excess in every 10,000 Persons of Births above Deaths.
First District	112	Deaths (1 in 54) / Births (1 in 34)	Deaths - 184 / Births - 297	113
Second District	121	Deaths (1 in 48) / Births (1 in 33)	Deaths - 208 / Births - 302	94
Third District	183	Deaths (1 in 39) / Births (1 in 29)	Deaths - 259 / Births - 348	89

From these Tables it will be seen, that in the 14 counties where the proportionate mortality has been the least, the 184 deaths in 10,000 persons were more than made up by 297 births, and that 113, or more than 1 per cent., was added by new births to the existing population. In the 14 intermediate counties, where the deaths in every 10,000 persons were 208, the loss was again made up by 302 births, and 94, or close upon 1 per cent., was added to the population. In the 14 counties where the increase of the population has been the greatest, the deaths in every 10,000 persons were 259; but here also we find that the births were more than sufficient to make up for the deaths, for they amounted to 348, showing an increase in the population by 89, or less than 1 per cent.

COMPARATIVE MORTALITY OF DIFFERENT CLASSSES OF SOCIETY.

THE following are the general results deduced by the Poor Law Commissioners (Sanitary Report), from a careful examination of the Mortuary Registries of Manchester, Leeds, Liverpool, Bath, Kendal, Wilts, Rutland, and the Bethnal and Strand Unions (Metropolis). The deaths in each class are compared with those of the total mortality: thus, "as 1 to $3\frac{1}{2}$" means — one of every $3\frac{1}{2}$ deaths under 20 years of age occurs among the higher classes:—

1. *Deaths under 20 Years of Age.*

In the Higher classes..... as 1 to $3\frac{1}{2}$
— Middling..... 1 to 2
— Lower..... 1 to $1\frac{1}{2}$

2. *Deaths between 20 and 60.*

In the Higher classes..... as 1 to 4
— Middling..... 1 to $3\frac{1}{2}$
— Lower..... 1 to 4

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TABLE OF THE STRENGTH AND OTHER PROPERTIES OF BRITISH IRONS.

We present here the results of a series of experiments, unrivalled as well in number and variety as in carefulness and accuracy, which were recently made by Mr. William Fairbairn, the eminent engineer, and communicated to the Philosophical Society, Manchester. No table of equal authority to this has been ever before published. Each bar is here supposed to be reduced to exactly one inch square. The transverse strength (which may be taken as the criterion of the value of cast iron) exhibits the mean of the experiments, one set of which were made with bars four feet six inches between the supports, and another with bars of half that length. All the other values are deduced from the experiments with four feet six inch bars. The modulus of elasticity in col. 5. was usually taken from the deflection caused in such bars by a weight of twelve pounds.

Number of Iron in the scale of strength.	Names of Irons.	Number of experiments in each.	Specific Gravity.	Modulus of Elasticity in Pounds per Square Inch or Stiffness.	Mean breaking Weight in Pounds.	Ultimate Deflection of 4 Ft. 6 In. Bars in Parts of an Inch.	Power of 4 Ft. 6 In. Bars to resist Impact.	Colour and Quality.
1	Ponkey, No. 5. Cold Blast	4	7·122	17211000	581	1·747	992	Whitish gray, Hard.
2	Devon, No. 3. Hot Blast	2	7·251	24473650	557	1·09	589	White, Hard.
3	Oldberry, No. 3. Hot Blast	5	7·500	22735100	530	1·005	549	White, Hard.
4	Carron, No. 3. Hot Blast	2	7·056	17875100	527	1·365	710	Whitish gray, Hard.
5	Beaufort, No. 3. Hot Blast	5	7·069	16802000	517	1·599	807	Dullish gray, Hard.
6	Butterley	4	7·058	15379500	502	1·815	889	Dark gray, Soft.
7	Bute, No. 1. Cold Blast	4	7·066	15165000	491	1·764	872	Bluish gray, Soft.
8	Windmill End, No. 2. Cold Blast	4	7·071	16490000	489	1·581	765	Dark gray, Hard.
9	Old Park, No. 2. Cold Blast	5	7·049	14607000	485	1·621	718	Gray, Soft.
10	Beaufort, No. 2. Hot Blast	4	7·108	16501000	474	1·512	729	Dull gray, Hard.
11	Low Moor, No. 2. Cold Blast	4	7·055	14509500	472	1·852	855	Dark gray, Soft.
12	Buffery, No. 1. Cold Blast	5	7·071	15381000	463	1·55	721	Gray, Rather hard.
13	Brimbo, No. 2. Cold Blast	5	7·017	14911666	459	1·748	815	Light gray, Rather hard.
14	Apedale, No. 2. Hot Blast	3	7·017	14852000	456	1·750	791	Light gray, Stiff.
15	Oldberry, No. 2. Cold Blast	4	7·059	14507500	455	1·811	822	Dark gray, Rather soft.
16	Pentwyn, No. 2.	4	7·058	15193000	455	1·481	650	Bluish gray, Hard.
17	Maesleg, No. 2.	5	7·038	13993500	454	1·957	886	Dark gray, Rather soft.
18	Muirkirk, No. 1. Cold Blast	4	7·115	14003550	455	1·751	770	Bright gray, Fluid.
19	Aclyhil, No. 2. Cold Blast	5	7·089	13815500	449	1·857	827	Light gray, Soft.
20	Blania, No. 3. Cold Blast	5	7·159	14281466	448	1·726	747	Bright gray, Hard.
21	Devon, No. 3. Cold Blast	4	7·285	22907700	448	·790	353	Light gray, Hard.
22	Gartsherrie, No. 3. Hot Blast	5	7·017	13894000	447	1·557	998	Light gray, Soft.
23	Frond, No. 2. Cold Blast	5	7·051	13112666	447	1·825	841	Light gray, Open.
24	Lane End, No. 2.	3	7·028	13787666	444	1·114	629	Dark gray, Soft.
25	Carron, No. 3. Cold Blast	5	7·094	16246966	443	1·356	595	Gray, Soft.
26	Dundavan, No. 3. Cold Blast	4	7·087	13534000	443	1·629	671	Dull gray, Rather soft.
27	Maesleg (marked red)	5	7·038	13971500	442	1·887	830	Bluish gray, Fluid.
28	Corbyn's Hall, No. 2.	5	7·007	13845866	442	1·687	727	Gray, Soft.
29	Pontypool, No. 2.	5	7·080	15136500	440	1·857	816	Dull blue, Rather soft.
30	Walbrook, No. 3.	5	6·979	15394766	440	1·445	625	Light blue, Rather hard.
31	Milton, No. 3. Hot Blast	4	7·051	15852500	438	1·368	585	Gray, Rather hard.
32	Buffery, No. 1. Hot Blast	3	6·998	13730500	436	1·61	721	Dull gray, Soft.
33	Level, No. 1. Hot Blast	5	7·080	15432500	432	1·516	671	Light gray, Soft.
34	Pant, No. 2.	5	6·975	15280966	431	1·251	511	Light gray, Rather hard.
35	Level, No. 2. Hot Blast	6	7·031	15241066	429	1·358	570	Dull gray, Soft.
36	W. S. S., No. 2.	5	7·041	14953333	429	1·359	554	Light gray, Soft.
37	Eagle Foundry, No. 2. Hot Blast	4	7·058	14211000	427	1·512	618	Bluish gray, Soft.
38	Elsicar, No. 2. Cold Blast	4	6·928	12586500	427	2·224	992	Gray, Soft.
39	Varley, No. 2. Hot Blast	4	7·007	15012000	426	1·450	621	Gray, Hard.
40	Cotham, No. 1. Hot Blast	5	7·128	15519066	421	1·532	716	Whitish gray, Rather soft.
41	Carroll, No. 2. Cold Blast	4	7·069	17056000	419	1·231	550	Gray, Hard.
42	Muirkirk, No. 1. Hot Blast	4	6·953	15294400	418	1·570	656	Bluish gray, Soft.
43	Bierley, No. 2.	5	7·185	16156133	418	1·222	494	Dark gray, Soft.
44	Coed-Talon, No. 2. Hot Blast	4	6·969	14322500	416	1·882	771	Bright gray, Soft.
45	Coed-Talon, No. 2. Cold Blast	5	6·955	14504000	413	1·470	600	Gray, Rather soft.
46	Monkland, No. 2. Hot Blast	3	6·916	12259500	405	1·762	709	Bluish gray, Soft.
47	Lee's Works, No. 1. Hot Blast	3	6·957	11529533	392	1·890	742	Bluish gray, Soft.
48	Milton, No. 1. Hot Blast	4	6·976	11974500	369	1·525	538	Gray, Soft and fluid.
49	Plaskynaston, No. 2. Hot Blast	5	6·916	13541633	357	1·366	517	Light gray, Rather soft.

From the preceding Table it appears, that the iron of greatest strength was the Ponkey, manufactured by cold blast, which required a weight of 581 lbs. to break it, and that the weakest is the Plaskynaston, from hot blast, which gave way at 337 lbs. The mean of these two extremes is 469; but it may be safer to take a general mean of the whole irons experimented upon, which is 445·6, as the average strength of British irons.

Rule. — To find from the above Table the breaking weight in rectangular bars, generally, calling b and d the breadth and

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depth in inches, and l the distance between the supports in feet, and putting 4·5 for 4 ft. 6 in., we have $\frac{4{\cdot}5 \times b d^2 S}{l}$ = breaking weight in lbs. The value of S being taken from the Table above.

For example: What weight would be necessary to break a bar of Low Moor iron 2 in. broad, 3 in. deep, and 6 ft. between the supports? According to the rule given above, we have b=2 inches; d, 3 inches; l, 6 feet; S, 472 feet from the table. Then $\frac{4{\cdot}5 \times b d^2 S}{l} = \frac{4{\cdot}5 \times 2 \times 3^2 \times 472}{6} = 6372$ lbs., the breaking weight.

TABLE OF THE COMPARATIVE SALUBRITY OF THE FIVE DISTRICTS OF THE METROPOLIS.

Seasons.	Weeks.	West District.	North District.	Central District.	East District.	South District.	Whole Metropolis.	Deaths in the Four Seasons out of 10,000 Persons.
Winter - -	13	2127	2588	3064	3227	3542	14548	78
Spring - -	13	1611	2066	2264	2264	2682	10887	58
Summer - -	13	1486	1817	2064	2220	2458	10045	54
Autumn - -	13	1518	1959	2144	2476	2653	10752	57
Totals -	52	6742	8430	9536	10187	11387	46232	247
Population enumerated in 1841 -		300705	365660	373805	392496	438060	1870727	
Deaths out of 10,000 inhabitants - -		224	231	255	260	259	247	
Number of inhabitants out of which one death happens		44·60	43·38	39·20	38·53	38·64	40·464	

The WEST DISTRICT comprises: Kensington, St. George, Hanover Square, Westminster, St. Martin-in-the-Fields, St. James.

The NORTH DISTRICT — St. Marylebone, St. Pancras, Islington, and Hackney.

The CENTRAL DISTRICT — St. Giles and St. George, Strand, Holborn, Clerkenwell, St. Luke, East London, West London, City of London.

The EAST DISTRICT — Shoreditch, Bethnal Green, Whitechapel, St. George-in-the-East, Stepney, Poplar.

The SOUTH DISTRICT — St. Saviour's, St. Olave, Bermondsey, St. George, Southwark, Newington, Lambeth, Camberwell, Rotherhithe, Greenwich.

WEIGHT AND STATURE OF MEN OF DIFFERENT COUNTRIES.

lbs. av.

THE mean weight in Belgium (Brussels) and environs of a man is..... 140·49

In France (Paris and neighbourhood), the man is..... 136·89

The mean weight of the Englishman (taken at Cambridge) from 18 to 25 150·98

(In coaches it is usually considered that it averages 165 lbs.)

The mean height of the Belgian male is ..... 5 ft. $6\frac{3}{10}$ in.

ft. in.

The mean height of the Frenchman is..... 5 4

Ditto Englishman .... 5 $9\frac{1}{2}$

In recruiting for the French army, the standard is now fixed at 1·566 metres of height, which is about 5 feet $1\frac{1}{2}$ inches English. Fifty years ago, however, the French standard height was 5 feet 4 inches English.

The English standard is for the Foot Guards 5 feet 6 inches.

REAL PROPERTY OF ENGLAND AND WALES.

FROM a return made to an order of the House of Commons last Session, it appears that the total annual value of real property assessed to the poor-rates in England is 59,685,412*l.*, of which 30,448,991*l.* consisted of landed property, 2,991,472*l.* of dwelling-houses, and 6,244,949*l.* of all other kinds of property.

Middlesex, although the smallest county but one, namely, Rutland, comprising as it does the greater part of London, is, as might be expected, the richest county of

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the kingdom, its total annual value of real property assessed amounting to no less than 7,293,369*l.* This sum is thus distributed: — Landed property, 304,653*l.*; dwelling-houses, 6,680,202*l.*; all other kinds of property, 308,514*l.*

Yorkshire ranks next to Middlesex in point of wealth, its total annual value of assessed property being 5,448,494*l.*, distributed as follows: — Landed property, 3,865,496*l.*; dwelling-houses, 1,817,739*l.*; all other kinds of property, 575,259*l.*

Lancashire comes next. The total annual value of real property assessed in the county of Lancaster is 5,266,606*l.*, made up as follows: — Landed property, 1,402,208*l.*; dwelling-houses, 2,449,196*l.*; all other kinds of property, 1,415,222*l.*

Rutland, as it is the smallest, so is it also the least wealthy county, its total annual value of real property being only 119,134*l.*, composed as follows: — Landed property, 106,119*l.*; dwelling-houses, 9,104*l.*; all other kinds of property, 3,911*l.*

Westmoreland is the next least wealthy county, the total annual value of its real property assessed being 266,335*l.*; made up of real property, 221,054*l.*; dwelling-houses, 37,374*l.*; all other kinds of property, 7,907*l.*

Huntingdon is next, the total annual value of its real property assessed being 317,718*l.*, made up as follows: — Landed property, 236,633*l.*; dwelling-houses, 71,221*l.*; all other kinds of property, 9,864*l.*

The sum levied for poor-rates in England for the year ending Lady-day, 1841, was 6,009,564*l.* The rate in the pound on the annual value of real property assessed in 1841 was, for the whole of England, 2*s.*

It is a circumstance worthy of notice, that the rates are highest in those parts of the country which we are not accustomed to refer to as the most distressed. The highest rated county is Wilts, in which the rate amounts to 3*s.* in the pound. In Sussex the rate is only 1*d.* in the pound less than Wiltshire — namely, 2*s.* 11*d.* In Buckinghamshire, Suffolk, and Surrey, the rate is 2*s.* 9*d.* in the pound; in Essex, Dorset, Gloucester, and Southampton, it is 2*s.* 8*d.*; whilst in Yorkshire it is only 1*s.* 11*d.* and in Lancashire 1*s.* 8*d.*

As all the counties in which the rates are highest are those where there is no coal, and fuel is dear, there can be little doubt that it is owing to the abundance of coal in the manufacturing districts that the pressure of poverty is there so greatly alleviated.

The rate per head of annual value of real property is for the whole kingdom, 3*l.* 19*s.* 7*d.* The rate per head is highest in Hertfordshire — namely, 5*l.* 19*s.* 1*d.*, and lowest in Cornwall — namely, 2*l.* 13*s.* 4*d.*

The area of England in English statute acres is 31,770,615. The average annual value per acre for the whole kingdom is 19*s.* 2*d.* Middlesex is the county in which the value reaches the highest point — the average value there is 1*l.* 14*s.* per acre. In Leicestershire the annual value per acre is 1*l.* 7*s.*, and in Lancashire 1*l.* 5*s.* The county in which land is of the lowest value is Westmoreland, where the average annual value per acre is only 9*s.* 1*d.*; in Northumberland it is 12*s.* 9*d.*, and in Sussex it is 13*s.* 6*d.*

The total annual value of real property in Wales assessed to the poor-rates is 2,854,618*l.*, of which 2,206,146*l.* consists of landed property, 394,929*l.* of dwelling-houses, and 253,543*l.* of all other kinds of property.

The total sum levied in Wales for poor-rates for the year ended Lady-day, 1841, was 342,264*l.* The average rate in the pound for the whole country is higher than in England, it being 2*s.* in the latter, and 2*s.* 5*d.* in Wales. The poor-rates are highest in Carnarvonshire, namely, 3*s.* 2*d.* in the pound, and lowest in Brecon, 1*s.* 7*d.*

The area of Wales in English statute acres is 4,752,000. The average annual value per acre for the whole country is 9*s.* 3*d.* Land is most valuable in Anglesea, where the average value is 13*s.*; and least valuable in Merionethshire, where the average value is 4*s.* 8*d.*

BRITISH SHIPPING. — SAILING AND STEAM VESSELS.

[*Compiled from the latest Official Returns.*]

THE number and tonnage of sailing and steam-vessels registered on the 31st of December, 1841, at the ports of Great Britain and Ireland, distinguishing those under from those above 50 tons register, were as under:—

Sailing vessels, under 50 tons, 8,319; tonnage, 249,996; above 50 tons, 13,628; tonnage, 2,540,952. Total of sailing vessels, 21,957; of tonnage, 2,790,948.

Steam-vessels, under 50 tons, 325; tonnage, 8,166; above 50 tons, 465; tonnage, 87,512. Total of steam-vessels, 790; of tonnage, 95,678.

Gross total of vessels, 22,747; of tonnage, 2,886,626.

The number and tonnage of vessels that entered and cleared coastwise at the ports of Great Britain and Ireland (including their repeated voyages) between the 31st of December, 1840, and the 31st of December, 1841, were,—

Sailing vessels (inwards), 133,016; tonnage, 9,637,380; (outwards), 128,819; tonnage, 9,961,312. Total of sailing vessels, 261,835; of tonnage, 19,598,732.

Steam vessels (inwards), 15,136; tonnage, 2,003,784; (outwards), 15,004; tonnage, 2,648,146. Total of steam vessels, 30,140; of tonnage, 5,541,930.

Gross total of vessels 221,975; of tonnage, 25,140,662.

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The number and tonnage of vessels that entered and cleared from and to the colonies, at the ports of Great Britain and Ireland (including their repeated voyages), between the 31st of December, 1840, and the 31st of December, 1841 : —

Sailing vessels (inwards), 6,350; tonnage, 1,484,253; (outwards), 6,382; tonnage, 1,471,118. Total of sailing vessels, 12,732; of tonnage, 2,955,371.

Steam vessels (inwards), 244; tonnage, 37,233; (outwards), 232; tonnage, 38,571. Total of steam vessels, 476; of tonnage, 75,804.

Gross total of vessels, 13,208; of tonnage, 3,031,175.

The number and tonnage of vessels that entered and cleared from and to foreign ports, distinguishing British from foreign, at the ports of Great Britain and Ireland (including their repeated voyages), between the 31st December, 1840, and the 31st December, 1841, was as follows : —

British sailing vessels (inwards), 9,803; tonnage, 1,516,283; (outwards), 9,863; tonnage, 1,595,266. Total of vessels, 19,666; of tonnage, 3,112,549.

Foreign sailing vessels (inwards), 9,015; tonnage, 1,231,996; (outwards), 9,262; tonnage, 1,270,435. Total of vessels, 18,277; of tonnage, 2,502,421.

British steam vessels (inwards), 1,938; tonnage, 323,442; (outwards), 1,987; tonnage, 324,324.

Gross total of British vessels, 23,591; of tonnage, 3,760,315.

AN ACCOUNT of the Number of Fundholders and Estimate of the Amount of Dividends received by each; also an Account of the Number of Savings-Banks Depositors, and Estimate of the Amount of Deposits by each.

(*Compiled from Annual Returns for* 1840.)

FUNDHOLDERS.			SAVINGS-BANKS' DEPOSITORS.		
No. of Individuals.		Div. per Ann.	No. of Individuals.		Amount of Deposits.
		L.			*L.*
87,176	not exceeding	10	440,740	not exceeding	20
44,648	—	20	209,463	—	50
93,305	—	100	85,118	—	100
25,641	—	200	28,449	—	150
14,701	—	400	15,538	—	200
4,495	—	600	3,066	exceeding	200
2,827	—	1,000			
1,367	—	2,000			
266	—	4,000			
40	—	6,000			
15	—	8,000			
4	—	10,000			
12	exceeding	10,000			
274,497			782,374		

Public Companies and Joint Accounts.		*L.*	Charitable Institutions.		*L.*
151	not exceeding	4,000	7,988	total deposits	485,998
35	—	6,000			
24	—	8,000			
10	—	10,000	Friendly Societies.		
34	exceeding	10,000	7,693	Do.	1,005,345
254					

The whole of the deposits of the Savings Banks being periodically invested in Government Securities, each depositor is to the extent of the amount of his deposit, virtually as much a fundholder as if he were directly a holder of 3 per cent. consols, or any other Government Stock. From the preceding account it appears that there are 274,497 individual fundholders, and 782,374 individual Savings-Banks' Depositors — together 1,056,871. If we suppose each of the 254 public Companies and Joint Accounts, and each of the 7693 Friendly Societies (leaving the Charitable Institutions altogether out of the account) to represent 100 persons, which may be considered a moderate average — this would raise the total number of individuals holding directly or indirectly Government Stock to 1,851,571, or close upon two millions.

The total amount of the Funded Debt of Great Britain, 5th January, 1841, was 815,250,634*l.*

The total amount of the Deposits in Savings Banks, 20th November, 1840, was 23,471,050*l.*

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THE ROYAL STEAM NAVY.

Rules and Regulations respecting the Examination, Appointments, Rank, Pay, and Allowances, Allotment, Uniform, and Superannuation of Engineers in Her Majesty's Service.

THE Lords Commissioners of the Admiralty, in order to insure the efficiency of the engineers employed in the war steam navy of this country, have from time to time issued rules to regulate their examination as to qualification for the trust reposed in them; and, to keep pace with the improvements in steam navigation, and the great value of the vessels about to be constructed for the service, they have issued the following improved code of rules and regulations, dated June 23. 1842: —

EXAMINATION.

No person will be deemed eligible for an appointment as engineer, or for promotion to the second or first class, until he shall have passed an examination on the points stated below, or on such other points as the Lords Commissioners of the Admiralty may from time to time think proper to require before the captain-superintendent of Her Majesty's dockyard at Woolwich, and the chief engineer and inspector of machinery, or before such other officers as their Lordships may appoint for that purpose.

Before presenting himself, the candidate must prepare specimens of working sketches, and of his proficiency in accounts.

First-class Engineers. — No person will be considered qualified to hold the warrant of first-class engineer who is not able to keep accounts, and to make notes in the og of every particular of the working of the engines and boilers.

He must be thoroughly acquainted with the working of the principles on which the machine works in all its parts, capable of working the engines and boilers, and of setting right any defects which may arise in them, and of adjusting the length of the various rods and motions, slide-valves, eccentrics, &c.

He must also be able to make rough sketches, with the requisite dimensions fit to work from, of every part of an engine, and be willing to take charge of the engineers' boys.

Second-class engineers must not be inferior in education to those of the first class, and but little inferior to them in mechanical acquirements, and must also be willing to take charge of and teach the engineers' boys.

Third class engineers must be equal in education to the section and first class engineers, and acquainted with the principles of marine engines and boilers, and with the names and uses of all their parts. They must also be able to make rough sketches as before described.

Those who have not served in Her Majesty's navy as engineers' boys, must be examined by the surgeon of the establishment as to their being of sound bodily constitution, and they must produce well authenticated certificates from the engineers in whose factories they have worked, of their being skilful workmen, of good disposition, and of good conduct in every particular, especially as regards sobriety.

APPOINTMENT.

Engineers are appointed by warrant from the Lords Commissioners of the Admiralty, or by commanders-in-chief on foreign stations, in vacancies occasioned by death in the same manner as other warrant officers of the navy are appointed.

No person will be considered eligible for a second class engineer, without having served at sea as an engineer; nor the first class, without having served as chief engineer of a sea-going steam-vessel. In either case the candidate must produce satisfactory testimonials of his efficiency and good conduct while thus serving at sea.

An engineer, after having served three years in the third class, will be permitted, if he can produce good certificates from the commanders under whom he may have served, to present himself in examination for the second class, when a suitable opportunity shall offer, and, in like manner, after having served three years in the second class, he will be permitted to present himself for examination for the first class. If, however, on examination, it shall appear to the examining officers that the qualifications of a candidate are such that a shorter period than three years may be sufficient to enable him to acquire the experience necessary for performing the duties of a higher class, a note thereof, with the reasons, will be made upon the passing certificate, which will render him eligible for examination and promotion in less than three years, if his subsequent conduct should appear to merit it.

RANK.

Engineers are distributed into three classes; they rank next below carpenters, and with each other according to their standing on the official list.

PAY AND ALLOWANCES.

To engineers when serving on board one of Her Majesty's steam-vessels in commission; or in any of Her Majesty's dockyards, whenever their services may be required there; or in repairing their own or any other vessel in the home dockyards — Holyhead, the river Thames, Portsmouth, or Plymouth-harbour, or when the vessel to which they belong is paid off, and they are still retained on board: —

First class, 12*l.* per lunar month; second class, 8*l.* per lunar month; third class, 5*l.* 6*s.* per lunar month.

When borne on the books of the guardships of the ordinary, and not actually em-

ployed in the charge or repair of steam machinery. — First class, 7*l.* 17*s.* per month; second class, 4*l.* 18*s.* per month; third class, 3*l.* 8*s.* per month.

The first class engineer of ships in commission is to have the instruction of two engineers' boys, and to receive an allowance of 6*d.* per day for each.

When there are three engineers' boys, the second class engineer is to instruct the junior boy of the three, and to receive the allowance of 6*d.* per day.

When there are four engineers' boys the senior second class engineer is to instruct the third boy; the junior second class engineer the fourth boy; and each is respectively to receive the allowance of 6*d.* per day for the instruction of the boy placed under him.

This allowance is to be granted only on the production of a certificate from the commanding officer under whose orders the engineers may be actually serving, that the boys have been duly instructed in conformity with the established regulations, and such certificate is never to be granted unless the superintendent of the dockyard, or the officer in command of the vessel, be thoroughly satisfied from personal observation that the intentions of these regulations have been strictly carried into effect.

Engineers when serving on board one of Her Majesty's steam-vessels within the tropics, while the steam is up, are to receive one-half the amount of the pay of the respective classes in addition, for which they may draw every six months, whether they allot or not.

When engineers do not draw for their tropical pay, a certificate is to be granted to them, similar to that on the back of the bill for the adjustment of their claims to the said pay on their arrival in England.

Engineers of vessels in commission when employed in repairing defects of other vessels than those in which they are serving, except in the home dockyards, Holyhead, the River Thames, Portsmouth, or Plymouth harbour, to be allowed extra pay as warrant officers in addition, according to the scale established by Her Majesty's regulations — namely, 2*s.* a day.

ALLOTMENTS AND MONTHLY ALLOWANCE.

The following are the scales of allotments and monthly allowance for engineers while actively employed and while employed in guard-ships.

ALLOTMENT WHILE ACTIVELY EMPLOYED.

	£	s.	d.
First engineer, per calendar month	6	10	0
Second engineer, ditto - -	4	6	0
Third engineer, ditto - -	2	17	0

ALLOTMENT WHILE IN GUARD-SHIPS.

First engineer, per calendar month	4	5	0
Second engineer, ditto - -	2	13	0
Third engineer, ditto - -	1	16	0

MONTHLY ALLOWANCE WHILE ACTIVELY EMPLOYED.

First engineer, per calendar month	3	10	0
Second engineer, ditto - -	2	5	0
Third engineer, ditto - -	1	10	0

MONTHLY ALLOWANCE WHILE IN GUARD-SHIPS.

	£	s.	d.
First engineer, per calendar month	2	10	0
Second engineer, ditto - -	1	10	0
Third engineer, ditto - -	1	0	0

UNIFORM OF FIRST ENGINEERS.

Coat. — Blue cloth, double breasted; buttons having a steam-engine, with a crown above, embossed on them, to be placed four and four, and a larger button of the same kind on the collar.

Waistcoat. — With buttons similar to those on the coat.

Trousers. — Plain blue cloth.

Cap. — With a narrow gold lace band.

SUPERANNUATIONS AND PENSIONS.

The following rules shall be observed in regard to superannuations and pensions of the engineers of her Majesty's fleet: —

1st, — That when engineers shall be found, upon survey, unfit for further service, they shall be allowed 3*l.* a year for each year they shall have served as warrant-officers in ships in commission; and 1*l.* a year for each year they shall have served as warrant-officers in ships in ordinary, or as supernumeraries, in guard ships.

2dly, — That in cases in which the services of engineers shall appear to the Lords Commissioners of the Admiralty to be more than ordinarily meritorious, a further sum may be allowed to the said warrant-officers, in addition to the pension allowed by art. 1., varying from 1*l.* to 15*l.* a year, reference being had to the character of the officer, and the cause which may have rendered him unfit for service.

3dly, — 1. that engineers who may lose two limbs in action; 2. or who may receive wounds or injuries in action equal to the loss of two limbs; 3. or who may receive injuries or hurts in the service, though not in action, equal to the loss of two limbs, shall be allowed pensions (as the Lords Commissioners of the Admiralty may deem proper), not exceeding in the first case 50*l.* a year, nor in the second case 45*l.* a year, nor in the third case exceeding 35*l.* a year.

4thly, — 1. that engineers who may lose one limb in action; 2. or who may receive wounds or injuries equal to the loss of a limb; 3. or who may receive injuries or hurts in the service, though not in action, equal to the loss of a limb, shall be allowed pensions (as the Lords Commissioners of the Admiralty may deem proper, not exceeding in the first case 25*l.* a year, nor in the second case exceeding 20*l.* a year, nor in the third case exceeding 15*l.* a year.

The pensions for wounds and hurts to be granted after a careful survey, held by the officer at this office, when practicable, and to be in addition to any other pension the officer may be entitled to.

5thly, — No engineer to be allowed to reckon as service towards superannuation any period of time during which he shall

not have maintained a good character in the ship in which he has served.

REGULATIONS AS TO THE INSTRUCTION AND QUALIFICATION OF ENGINEERS' BOYS.

4th Class. — Boys on entering the service as fourth class apprentices must not be less than 14 nor more than 17 years of age: they must be of good moral character and sound bodily constitution, and able to write and work a question in the rule of three.

3d Class. — At the expiration of their third year of service, provided their conduct has been good during that period, the boys will be considered eligible for removal to the third class, if on examination they appear to have made themselves acquainted with the names and uses of every part of the engines, gauges, barometers, &c.

2d Class. — If boys, in the fourth year from their entrance into the service, be acquainted, through the instruction of the engineer under whom they may be placed, with the whole principle of the engine and boilers, with the use of all the various tools, and with the mode of effecting repairs, as far as they are performed on board; if they be able to take off and replace any of the working parts; pack the slide-valves, pistons, piston-rods, and stuffing-boxes; if they understand the action and condensation of steam, the return of water into the boilers, the construction of all the pumps, and of the feeding and blowing off apparatus, safety valves, &c., and can chalk out roughly the outlines of the engines and wheels, and have become generally useful, they will be considered fit for removal to the second class, provided their conduct has been good.

Boys of the second class having attained the fifth and last year of their service will be transferred to her Majesty's dockyard, at Woolwich, where they will receive instructions on various subjects connected with the construction and management of engines and boilers.

First Class. — At the expiration of the fifth year, if, on a strict examination, the boys be found qualified for the appointment of third class engineers, and if their conduct has been in all respects satisfactory, they will be removed to the list of the first class, and be considered candidates for promotion, and will take precedence according to conduct and abilities.

Pay of engineers' boys per lunar month. — First class, *1l.* 14*s.*; second class, *1l.* 6*s.*; third class, *1l.* 3*s.*; fourth class, 14*s.* 6*d.*

Monthly allowance. — During the first 12 months' servitude from the time of their first entry on board the ship, 2*s.*; after 12 months' servitude at home, 3*s.*; abroad, 4*s.*

REMARKS ON THE PRECEDING RULES AND REGULATIONS.

The pay is liberal, and, so far as pay goes, well calculated to secure the services of men possessing all the qualifications required. Not so the superannuation allowances and pensions, which are disproportionately small, and very palpably inadequate.

Engineers of all the three classes are to have the rank of *Warrant Officers*, and to take precedence "*next below the carpenters*," — that is below the lowest (heretofore) of the class, caulkers only excepted! Here is that which spoils all — a grand error which will go far to destroy all the good effect anticipated from the liberal pay and not so liberal allowances and pensions — a noxious ingredient thrown contemptuously — inconsiderately at least — into the cup, of which the sure effect must be to turn the whole to gall and wormwood.

Why *should* the engineers rank so low? a degree higher only than your handler of oakum and stopper of holes!

The qualifications required of the engineers are qualifications equal to those required of any officer of the ward or gunrooms; — they must be persons, not only of *good*, but of *scientific* education — masters of all the knowledge of a Watt, and of almost all the decision and promptitude of a Nelson. In a letter which we have seen from the head of an eminent steam-engine building firm, there is a passage so apposite to this particular point, that we cannot forbear from here quoting it — though written certainly with no view to publication, and with little expectation (we fancy) that the valuable class of men in question were about to be so unwisely treated by her Majesty's government. "I have been an eye-witness," he says, "to many instances of great emergency where the safety of all depended upon *the thought of the instant*— where your marine engineer has exhibited a degree of inventive power, united to a coolness of judgment and readiness of execution, such as none but the mechanics of Great Britain, and those *the very best of their class*, could have displayed." Who, *then*, may we ask, was *chief* officer? Not either captain, or lieutenant, or master, or *even* gunner, or carpenter, or caulker, but undeniably the ENGINEER, who, everywhere else, but *at his post and in public estimation*, ranks below them all!

Between no two classes of officers is the analogy so close and striking as between the *engineer* and the *master*. The one does all in regard to the *steaming* of the ship, which the other does in regard to *the sailing*. To whatever extent a vessel *steams* in the course of a voyage, to that extent nearly does the engineer supersede the master in his peculiar province, which is that of *navigating* the vessel or directing her course. When danger threatens, the master is directed by the "Naval Instructions" to represent the circumstances to the captain; but what can the master (such sailing masters, at least, as are found usually on board of ships) tell of the danger arising from a failure in steam machinery? The person with whom the captain must then

consult and advise is *not* the master, but THE ENGINEER, and him alone. A new order of circumstances has arisen, which has called into being a new set of officers, to perform duties, for the performance of which the old class of sailing masters are entirely unfitted; and it seems but reasonable that the individual who has a master's duties to perform, and will generally be found more than his equal in education and acquirements, should not be inferior to him in nominal rank.

Again, the pay of the engineers, as now settled, is superior to that of all *other* warrant officers, and superior even to that of many of the commissioned officers of the service. How is it possible to reconcile such high pay with such low rank? Either the pay is too great for the rank, or the rank is too low for the pay. To give a man, pronounced by order of the Lords of the Admiralty to be a fit companion for carpenters and caulkers only, the income of a first lieutenant (much more, indeed, taking all the allowances into account), must have an inevitable tendency to produce low, grovelling, perhaps dissolute and intemperate habits—to break down and demoralize a class of men, whom it ought to be our study to elevate as much as possible in the scale of intellectual vigour and moral worth.

No—if the Lords Commissioners of the Admiralty would encourage the growth of the new and prodigious power which science has placed in their hands, as it deserves and ought to be encouraged—if they would deal by the steam marine as fairly as by the other branches of the service—they will forthwith revise all that part of their present edict which relates to the "rank" of marine engineers. They have given them the pay of gentlemen—let them go a step further, and give them also the rank of gentlemen to uphold, which will bring with it the desires, inclinations, and pursuits of gentlemen. The sort of men wanted for this service are such as are to be found on shore occupying, in our steam-engine factories, the situations of overseers, foremen, draughtsmen, &c., and who must have qualified themselves for these situations by much and long training and study. Now these, in every proper sense of the word, are gentlemen already—persons who would think it much beneath them to associate on shore with those whom you propose to place them "next below" at sea. You seek to encourage these men to enter your service, and would wish, we presume, that they should not become, while in it, less valuable than they were before; and the first thing you do towards that end is, to assign them a rank which must at once degrade them in their own estimation, as well as in the estimation of others! Was ever conduct more ill-judged, more uncalled-for, or more pernicious?

While the pay is so high, there will never be wanting men to take the situations of marine engineers; but they will not be of the superior description we have just indicated; or if occasionally a person of that description is tempted by love of gold to enter the service, you may calculate with great certainty on his losing rapidly, under the influence of your letting-down system, all the superiority he ever possessed. Overpaid or underrated, all are sure to fall short, in the end, in point of merit and efficiency.

As there are *sailing* masters and mates with the rank of officers, so also should there be *engineer* masters and mates of the same rank; not a reason can be suggested why there should be the slightest difference made between them.

With the rank of officers, the engineers should also have retiring allowances suitable to that rank; half-pay, in short, on the same scale as other officers, and not such contemptible steerage-class "pensions" as are assigned to them by the present Rules and Regulations.

In a word, until the steam-engineer department of the navy is placed, in every respect, on the same footing as the sailing, fighting, and civil departments, it is vain to expect that it will ever be equal to them in efficiency, or productive of half the excellent service which it is capable of rendering to the country.

THE PRACTICE OF GUNTER'S SCALE.

THE area of any plane figure is the measure of the space contained within its extremes or bounds. This area, or the content of the plane figure, is estimated by the number of squares contained in it; the sides of these squares being an inch, a foot, a yard, a chain, or any other fixed quantity; and hence the area or content is said to be so many square inches, feet, yards, chains, &c.

Land, for example, is estimated in acres, roods, and perches. An acre is equal to ten square chains, that is, ten chains in length and one chain in breadth; also, an acre is divided into four parts called roods, and a rood into forty parts called rods, perches, or poles. The chain generally used, called Gunter's Chain, from its inventor, the Rev. Edmund Gunter, is four poles, or 22 yards, or 66 feet in length. It consists of 100 equal links, and the length of each link is therefore $\frac{22}{100}$ of a yard, or $\frac{66}{100}$ of a foot, or 7·92 inches.

An acre of land then consists of,

1000 × 10 = 100,000	square links.	
660 × 66 = 43,560	—	feet.
220 × 22 = 4,840	—	yards.
40 × 4 = 160	—	rods.

Lines measured with a chain are set down

in links as integers, every chain in length being 100 links; therefore, after the content is found it will be in square links; then cut off five of the figures on the right hand for decimals and the rest will be acres; these decimals are then multiplied by four for roods, and the decimals of these again by 40 for perches.

The great merit of Gunter's chain consists in his having so ingeniously availed himself of the accidental circumstance, that the tenth part of an acre is equal to a square whose side is four perches or poles, or 22 yards; hence he took 22 yards for the length of his chain, which he afterwards divided into 100 parts called links—a link being equal to 7·92 inches. Any decimal division of the chain would have answered his purpose, so far as the facility of calculation was concerned, but had he divided it into ten parts only, there might be an error of 2·2 yards in every line; and had he divided it into 1000 parts, the number would be very large, and the inevitable errors of observation would far exceed the unit of the scale, which would be less than an inch. According to his division of the chain, lines may easily be measured nearly within half-a-foot, which is sufficiently accurate for all purposes of surveying. From what has been stated, it will be seen that an acre contains 100,000 square links; by setting off, therefore, five decimal places to the right from the results in square links—which is equivalent to dividing by 100,000—we have the number of acres, whereas, if the same superficies had been obtained in square feet, we should, for the same purpose, have had to divide by 43,560, the number of square feet in an acre.—*Bruff's Engineering Field Work.*

TABLE of the Tonnage, Dimensions, Armament, &c. of Twelve "Crack" Sailing Vessels of the British Navy, in 1842.

Vessels.	Guns.	Tonnage.		Length.				Breadth.		Depth of Hold.		Draught.				Area of Canvass spread.	Weight of Broadside.	Comp. of Men and Boys.	When built.
		Burden.	Displacement.	Lower Deck.		Keel.						Fore.		Aft.					
				Ft.	*In.*	*Ft.*	*In.*	*Ft.*	*In.*	*Ft.*	*In.*	*Ft.*	*In.*	*Ft.*	*In.*	*Sq. Ft.*	*Lbs.*		
Trafalgar	120	2721	4671	205	5½	170	6	55	6	23	2	24	7	25	6	30500	9028	1000	1841
Queen -	110	3099	4483	204	0	165	6	60	0	23	9	22	6	23	5	29668	1940	950	1841
Rodney -	92	2598	4166	205	6	170	1	54	6	23	1	23	0	24	2	28140	1652	784	1833
Powerful -	84	2296	3570	196	1	162	0	54	5	22	6	22	6	25	2	27260	1488	750	1826
Vanguard	80	2590	3542	190	0	155	0	57	0	23	4	23	2	24	1	28100	1496	750	1835
Talavera -	74	1720	2965	174	0	143	2	48	3	20	0	21	4	24	0	24226	1224	638	1818
Vernon -	50	2082	2564	176	0	144	7	52	9	17	1	20	11	22	2	24595	908	500	1832
Stag -	46	1220	1568	159	3	133	3	42	0	13	3	17	11	19	5	17655	740	332	1830
Pique -	36	1622	1818	160	0	130	10	48	11	14	7	19	4	20	7	20019	648	320	1834
Inconstant	36	1421	1803	160	1	133	6	45	5	13	7	19	5	19	6	17530	648	320	1836
Calliope -	28	710	964	150	2	109	3	35	6	10	7	14	11	16	7	11270	452	240	1837
Carysfort -	26	911	970	130	0	105	11	40	10	11	6	16	0	18	0	14327	376	240	1836

TABLE of Approved Proportions of Stationary Steam Engines.

Nominal Power of Engine.	Diameter of Cylinder in Inches.	Length of Stroke in Feet.		Velocity in Feet per Minute.	Description of Work.	Length of Beam in Feet from Centre.		Depth at Centre.		Thickness of Metal.	Sectional Area.
Horse.											
80	47⅝	7	0	216	Blowing.....	12	0	39	72	2·5×2	198·6
...	47⅞	8	0	210	Rolling.....	12	4	48		2·5×2	240
65	42½	7	0	216	Grinding Corn.	10	9	42		2·5×2	210
56	40⅛	7	0	180	Pumping.....	10	4	36		2·25×2	162
55	39⅛	6	9	220	Blowing.....	9	6	38·5		2·5	96·25
50	39⅛	4	0	200	Blowing.....	6	9	25·5		2·5	63·75
45	39	3	9	210	Mill Work	6	6	30		3	90
45	36¾	6	3	216	Rolling.....	9	3	30		2	60
36	31½	6	0	216	Blowing.....	9	0	30		2	60
20	24¾	5	0	190	Mill Work.....	8	2½	24		2·25	54
20	23¾	5	0	216	Mill Work.....	8	0	25		2	50
14	20¼	4	6	200	Rolling.....	7	8	21		2	42
12	18½	4	0	216	Mill Work.....	6	10	22·25		2·25	50
8	15	4	0	216	Oil Mill.....	6	8	18		1·75	31·5

[PRINTED FOR THE COMPANY OF STATIONERS.]

AGGREGATE Amount of Notes circulated in the United Kingdom, distinguishing those of Private and Joint Stock Banks; with the Amount of Bullion in the Bank of England during the Four Weeks preceding the 23d July, 20th August, and 17th September, 1842.

Description of Notes.	During Four Weeks preceding		
	23d July, 1842.	20th August, 1842.	17th Sept. 1842.
	£	£	£
ENGLAND. — Bank of England	19,908,000	20,351,000	19,914,000
Private Banks	5,166,581	5,150,628	5,098,259
Joint-Stock Banks	2,939,195	2,823,090	2,819,749
SCOTLAND. — Chartered Private and Joint-Stock Banks	2,715,680	2,674,835	2,648,549
IRELAND. — Bank of Ireland	2,892,775	2,831,750	2,806,025
Private and Joint-Stock Banks	1,680,987	1,632,617	1,662,012
Total	35,303,218	35,463,920	34,949,594
Bullion in the Bank of England	8,833,000	9,570,000	9,816,000

TABLE of the Geographical Miles in a Degree of Longitude at every Degree of Latitude on the Terrestrial Globe, the Ellipticity of the Globe being taken at $\frac{1}{300}$.

Latitude.	1° Longitude.	Latitude.	1° Longitude.	Latitude.	1° Longitude.
	Miles.		*Miles.*		*Miles.*
0°	60·000	30°	52·004	60°	30·074
1	59·991	31	51·475	61	29·162
2	59·963	32	50·929	62	28·241
3	59·918	33	50·369	63	27·311
4	59·855	34	49·793	64	26·373
5	59·773	35	49·202	65	25·426
6	59·673	36	48·596	66	24·472
7	59·556	37	47·975	67	23·510
8	59·421	38	47·339	68	22·541
9	59·267	39	46·689	69	21·565
10	59·095	40	46·025	70	20·581
11	58·905	41	45·346	71	19·592
12	58·698	42	44·654	72	18·596
13	58·427	43	43·948	73	17·595
14	58·229	44	43·228	74	16·589
15	57·969	45	42·496	75	15·576
16	57·690	46	41·750	76	14·560
17	57·395	47	40·991	77	13·539
18	57·081	48	40·220	78	12·514
19	57·751	49	39·437	79	11·485
20	56·403	50	38·641	80	10·452
21	56·038	51	37·834	81	9·416
22	55·656	52	37·014	82	8·378
23	55·258	53	36·184	83	7·337
24	54·842	54	35·342	84	6·293
25	54·411	55	34·491	85	5·247
26	53·962	56	33·628	86	4·199
27	53·497	57	32·754	87	3·149
28	53·015	58	31·870	88	2·100
29	52·518	59	30·977	89	1·050

EXAMPLE. — How to find the miles in a degree of longitude by the above Table. Suppose the degree of latitude to be 29° 25′ 45″.

Length at 30°	52·004 miles.
Proportional part for 34′	·291
Proportional part for 15″	·2
Answer	52·297 miles.

[PRINTED FOR THE COMPANY OF STATIONERS.]

PRODUCE AND RETURNS OF ENGLISH AND FOREIGN MINES,

FROM JUNE 30. 1841, TO JUNE 30. 1842.

[From *Grylls's Annual Mining Sheet.*]

QUANTITY of Copper Ore sold from each Mine, British and Foreign — the Average Price per 21 cwt., and the Amount of Money — each Copper Company's Purchase — the Total Amount of Ore, Fine Copper, and Money — the Average Standard Produce and Price for the Year, both in Cornwall and Wales — the quantity of Tin purchased by the Tin Companies within the same time, &c.

Mines.	Ore from each mine. 21 cwt.	Amount in Money.	Average Price per 21 cwt.
CORNWALL.		£ s. d.	£ d. s.
Botallack	470	6,819 9 6	14 10 0
Buiier, Wheal	1,215	7,419 3 0	6 2 0
British Silver-Lead and Copper Mines	225	1,350 0 0	6 0 0
Brewer	166	988 4 0	5 13 0
Busy, Wheal	318	1,201 11 6	3 15 6
Bolenna	138	379 9 0	2 15 0
Bazeley's Ore	448	1,352 5 0	3 0 6
Consolidated Mines	11,617	73,558 6 0	6 6 6
Charlestown United Mines	1,106	18,603 7 0	16 16 6
Clifford, Wheal	189	1,195 5 0	6 6 6
Creeg Braws	685	5,552 6 0	8 8 0
Carzize	305	1,903 12 6	6 5 0
Curtis, Wheal	423	2,160 13 6	5 2 0
Chippendale, Wheal	85	538 0 6	6 6 6
Dolcoath	3,056	19,178 3 6	4 17 0
Damsel, Wheal	90	479 17 0	5 6 6
East Wheal Crofty	5,822	33,518 19 6	5 15 0
East Pool	2,943	21,172 0 0	7 4 0
East Downs, Williams's	430	2,342 17 0	5 9 0
Ellen, Wheal	1,025	4,821 10 0	4 13 0
Fowey Consols	13,292	78,446 5 6	5 18 0
Friendship, Wheal, &c.	3,275	17,088 6 0	5 4 6
Francis's Ore	257	758 17 6	2 19 0
Great Work	124	829 12 0	6 14 0
Gorland, Wheal	446	3,058 2 6	6 17 0
Great Wheal Charlotte	1,291	5,094 18 0	3 19 0
Hallenbeagle	4,350	20,430 4 6	4 14 0
Harmony, Wheal, and Cardrew	953	4,742 7 0	4 19 6
Holmbush	2,529	22,017 0 6	8 14 0
Harriet, Wheal	1,243	5,707 13 0	4 12 0
Harvey's Ore	360	1,016 18 6	2 16 6
Jewel, Wheal	2,720	16,500 13 0	6 1 6
Kitty, Wheal	242	1,130 4 6	4 12 6
Levant	2,470	23,769 5 6	9 12 6
Messer, Wheal	146	1,141 7 0	7 16 6
Maiden, Wheal	434	2,663 13 0	6 2 6
North Roskear	4,696	30,604 12 0	6 10 6
North Downs	1,771	12,379 12 0	7 0 0
Poldice	2,655	18,907 10 6	7 2 6
Perran Mines	130	484 0 0	3 14 6
Providence Mines	1,951	6,990 7 6	5 12 0
Providence, Wheal	662	4,954 11 6	7 9 6
Par Consols	5,589	41,923 5 0	7 7 6
Relistian	340	2,450 2 6	7 4 0
South Roskear	1,961	10,659 18 0	5 8 6
St. Andrew, Wheal	1,147	5,242 2 0	4 11 6
South Wheal Basset	2,577	17,649 0 6	6 17 0
Speed, Wheal	642	3,009 10 0	4 14 0
Stray Park	1,159	6,806 1 0	5 17 6
South Caradon	1,297	8,390 1 0	6 9 6
South Wheal Neptune	73	510 16 0	7 0 0
Sundry small mines	956	4,141 1 6	4 6 6
Tresavean	11,784	68,220 8 6	5 16 0
Trethellan	4,478	19,479 1 6	4 7 0

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TABLE — *continued.*

Mines.	Ore from each mine. 21 cwt.	Amount in Money. £	s.	d.	Average Price per 21 cwt. £	s.	d.
CORNWALL — *continued.*							
Trewavas, Wheal	2,633	14,928	6	0	5	13	6
Tretoil	2,310	12,018	13	6	5	4	0
Treleigh Consols	1,965	10,277	1	6	5	4	6
Trevaskus	88	936	18	0	10	13	0
Tehidy, Wheal	246	1,684	19	0	6	17	0
Tregothnan Consols	498	1,181	3	6	2	7	6
Trenwith, Wheal	51	451	17	0	8	9	6
Tregollan	405	1,680	8	0	4	3	0
United Mines	10,195	64,377	15	6	6	6	6
United Hills	3,718	18,453	15	6	4	19	6
Unity Wood, Wheal	1,025	6,956	7	6	6	15	6
Vor, Wheal	136	455	8	0	3	7	0
Vyvyan, Wheal	333	1,184	0	6	3	11	0
Virgin, Wheal	2,144	11,459	17	0	5	7	0
West Wheal Jewel	658	4,122	18	0	6	5	6
West Caradon	210	1,548	15	0	7	7	6
WALES.							
Allihies	3,479	32,637	12	6	9	7	6
Bearhaven	1,221	10,014	13	0	8	4	0
Conorree	147	1,248	14	0	8	10	0
Cosheen	303	2,742	15	0	9	1	0
Cuba	501	5,948	5	6	19	15	0
Cronebane	256	1,216	1	6	4	15	0
Copiapo	1,020	28,234	16	0	27	13	6
Cobre	23,585	314,665	17	0	13	18	6
Chili	7,336	170,241	3	6	23	4	0
Havana	45	518	10	6	11	10	6
Kenmare	211	2,409	14	0	10	9	6
Knockmahon	7,614	59,587	14	0	7	16	0
Llandidno	184	721	12	6	3	18	6
Llwyndu	195	777	3	6	3	19	6
Llywidd	177	1,250	3	6	6	19	0
Lackamore	569	4,783	14	0	8	8	0
Laxey	341	902	14	6	2	13	0
Prince	119	1,015	6	6	8	10	6
Palatine	92	1,400	14	0	15	4	6
Phœnix	271	656	8	0	2	8	6
Santiago	9,354	156,077	19	6	16	13	6
Sundry small mines	528	3,375	5	0	6	8	0
Tigrony	230	1,329	17	6	5	15	6
Valparaiso	97	4,498	4	6	46	7	6
Virgin Gorda	146	2,346	17	6	16	1	6

ORES CONSIGNED TO THE ENGLISH COPPER COMPANY IN THE YEAR.

Carn Brea Mines	10,104	—21 cwts.
Wheal Darlington	3,477	...
Cook's Kitchen	2,057	...
Godolphin	1,099	...
Wheal Lydia and South Towan	688	...
Tincroft	669	...
Duffield Mines	81	...
Wheal Trenwith	54	...
Trevaunance Consols	167	...
Sundry small Mines	232	...
Total	18,599	...

COPPER ORES SOLD IN CORNWALL. — Average standard, 120*l.* 16*s.*; Average price per 21 cwt., 6*l.* 1*s.* 6*d.*; amount of money, 822,870*l.* 12*s.*; Average produce, 7¼ and 1-16.; fine copper, 9896 tons, 3 cwt. 15 lbs.; copper ores, 135,581; consigned to the English Copper Company, 18,599. — Total, 154,180 21 cwts.

COPPER ORES SOLD IN WALES. — Average standard, 99*l.* 16*s.*; average price per 21 cwt., 147.5*s.*; amount of money, 808,181*l.* 17*s.*; average produce, 16½; fine copper, 9578 tons, 2 cwt. 3 qrs. 4 lbs.; copper ores, 56,821 21 cwts.

TOTALS IN CORNWALL AND WALES. — Copper ores, 192,402 21 cwts.; fine copper, 19,274 tons, 5 cwts. 3 qrs. 19 lbs.; amount of money, 1,631,052*l.* 9*s.*

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COPPER ORES PURCHASED BY THE COPPER COMPANIES IN CORNWALL AND WALES.

Purchasers.	Ores.	Copper.				Money.		
	21 cwts.	Tons	c.	q.	lb.	*L.*	*s.*	*d.*
Mines Royal Copper Co.....	8,654	917	3	1	13	78,610	8	2
English Copper Co.	13,768	1,599	9	2	21	137,140	15	6
Vivian and Sons	50,331	4,808	19	2	8	403,800	18	2
Freeman and Copper Co.....	21,678	1,836	11	1	1	155,184	1	11
P. Grenfell and Sons.....	23,531	2,406	12	1	4	202,915	17	5
Crown Copper Co.....	570	49	4	2	12	4,012	10	5
Sims, Willyams, and Co.....	20,255	1,929	13	0	19	163,467	6	8
Williams, Foster, and Co.....	53,415	5,726	11	3	25	435,920	10	9

COPPER ORES IMPORTED into the United Kingdom in the year ending Jan. 5. 1842, 48,685 (21 cwts.) 1 cwt. 3 qrs. 11 lbs.

FINE COPPER EXPORTED from the United Kingdom in the Year ending Jan. 5. 1842.—British copper, 5,926 tons, 11 cwts. 3 qrs. 7 lbs.; copper smelted from foreign ores, 10,087 tons, 3 cwts. 1 qr. 21 lbs.—Total, 16,013 tons, 14 cwts. 1 qr.

OBLIGATIONS OF THE LANDED INTEREST TO ARTS AND MANUFACTURES.

[THE following facts are extracted from an interesting communication made to the Statistical Section of the British Association during the recent meeting of that body in Manchester, by Mr. Henry Ashworth, of Turton.]

In 1607, Camden, after having visited the towns of Hull, Beverley, and other places on the eastern coast, speaks with a sort of apprehension of his prospect of entering Lancashire,—describing it as the part of the kingdom lying "beyond the mountains towards the Western Ocean," and regarding it not only as a foreign, but as hardly a civilised country.

In more recent times, the Lancastrians have been spoken of as roused only by "great objects"—above "petty bustle"—having a "contempt for shew," and characterised in their deportment by "plainness and downrightness."

In this otherwise unpromising locality manufactures and commerce have found a genial soil. In the hands of this race of people, the sciences of mechanics and chemistry have been applied to manufacturing industry with a practical intelligence previously unknown. Steam-power has been introduced, and successfully applied to all the varied forms of mechanical invention. Rivers, remembered only for the obstructions they *once* presented to monarchical and military aggression, are *now* directed to the propelling of machinery; they are lending their aid in the bleaching, dyeing, and printing of our fabrics, and assist in many other manufacturing and mercantile services. They are crossed with bridges, almost out of number, bearing roads and railroads through a country once of "destructive morasses and impenetrable woods."

Liverpool, two centuries since a small fishing station, and "the most convenient and usual place for setting sail into Ireland," has become a mercantile port, second only to the metropolis. All the towns previously existing have been greatly increased in magnitude and wealth, and other towns have come into existence, rivaling those of more ancient date. Many populous villages have also arisen, and the whole country has become thronged with myriads of industrious people, amounting by the present census to a larger population than any other English county.

The following Table will show the past and present State of the several Hundreds or Divisions of the County in respect of Population and Wealth.

	Population in 1801.	Population in 1841.	Annual Value of Real Property in 1692.	Annual Value of Real Property in 1841.	Rate of Increase per cent.
HUNDREDS OF	No.	No.	£	£	
Lonsdale	42,842	– –	8,500	301,987	3,500
Amounderness.....	39,618	– –	10,288	364,454	3,500
Leyland.....	30,461	– –	5,774	199,868	3,500
Blackburn	88,503	– –	11,131	497,541	4,400
Salford.....	281,413	– –	25,907	2,703,292	10,400
West Derby	189,728	– –	35,642	2,124,925	5,900
Totals.....	672,565	1,667,064	97,242	6,192,067	6,300

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From the preceding Table it appears, that in the course of 150 years the property of the county, as a whole, has been advanced 6300 per cent. The three hundreds which are chiefly agricultural have been advanced 3500 per cent., whilst those which are more engaged in manufactures and commerce have averaged an advance of 7000 per cent., or twice as much.

The following is a List of Twenty-three Towns and Places in which the advanced Value has exceeded 10,000 per cent.

Names of Places.	Annual Value in 1692.			Annual Value in 1841.	Rate of Increase per cent.
	£	s.	d.	£	
Places surrounding Manchester:					
Chorlton-upon-Medlock	256	4	2	137,651	53,000
Hulme	152	10	5	75,733	49,800
Ardwick	175	0	0	46,471	26,500
Salford	809	19	7	163,847	20,100
Cheetham	215	18	4	38,983	18,100
Manchester	4,025	0	0	721,743	17,900
Heaton Norris	281	15	0	45,175	16,000
Broughton	230	6	8	33,956	14,700
Pendleton	333	12	11	48,150	13,200
Crumpsall	95	6	3	13,537	13,000
Rusholme	146	13	4	15,281	10,400
Places in other Parts of Salford Hundred:					
Great Bolton	169	0	0	93,916	54,383
Little Bolton	132	19	7	47,111	35,600
Bury	220	14	7	52,882	24,000
Oldham	287	9	7	107,500	37,400
Royton	91	14	7	16,200	17,800
Heap and Heywood	265	14	7	41,632	15,700
Kearsley	56	4	7	9,035	16,100
Farnworth	141	10	0	17,071	12,100
Edgeworth	31	4	2	4,116	13,200
Wardleworth	200	3	9	29,456	13,100
Spotland	554	9	7	58,796	11,200
Ashton-under-Lyne	1,345	0	0	143,803	10,600

Even in those parts of the county where manufacturing industry has met with comparatively little or no encouragement, vast advantages have been derived to the land, from the improved market furnished by an adjacent population for the productions of the soil. In this way manufacturing industry has not only raised the prosperity of the places in which it was developed, but has extended its benefits to all the farming localities of the neighbourhood; raising the rental of *mere* LAND, in some cases 1500, and in others as much as 3000 per cent.

One, amongst the many instances of extraordinary increase in the value of property, has occurred in Chorlton upon Medlock, adjacent to Manchester. The Chorlton Hall estate, extending over most of the township, was sold in the year 1590, by Edmund Trafford, Esq., to Ralph Sorocold, for the sum of 320*l.* In 1644 it was sold to Thomas Minshull, apothecary, for 900*l.* The same estate was sold about the year 1794, or twenty years after the introduction of the cotton manufacture, for 70,000*l.*

	£
In 1815 the annual value of that township was	19,484
In 1829 it was	66,645
In 1841	137,651

Its annual value at the period of the land-tax was 256*l.* 4*s.* 2*d.*, and last year, by the county assessment, it was, as before stated, 137,651*l.*; the advance being upwards of 53,000 per cent. Taking the county assessment, and computing the property to be worth twenty-five years' purchase, its value in less than two centuries will have become increased from 900*l.* to upwards of 3,000,000*l.*!!!

The case of Westhoughton, near Bolton, presents a feature somewhat remarkable in the history of the cotton manufacture. In the year 1812, the first, or one of the first power-loom factories ever established, was in that township. The outrages of the Luddites of Nottinghamshire and Yorkshire occurring at that period, rendered it an unpropitious time for the introduction of machinery. Outrage was begun in the neighbourhood, which ended in the destruction of the mill by incendiary violence. The consequences of this rash act were not such as infatuated ignorance would have led the people to anticipate; namely, the obliteration of the invention of the power-loom. On the contrary, it merely took its flight from persecution, and apparently with a sagacity almost instinctive, located itself in the neighbourhood of Staley Bridge, upon the confines of four counties, a place almost out of observation before the introduction of the cotton manufacture. In this

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Place it has been allowed to remain in quietude, diffusing prosperity on every hand.

In 1814, there were in Staley Bridge twelve cotton manufacturing establishments, chiefly upon a small scale; and in 1841 there were thirty-two establishments, mostly upon a large scale, employing from 9000 to 10,000 workpeople, and having at work 536,000 spindles and 5000 power-looms.

Let us now return to the case of Westhoughton, and inquire how it has fared with that township, *following the expulsion of the power-loom.* The people have adhered principally to their former employment of hand-loom weaving, a branch of trade which has every year continued to decline. Manufacturing enterprise has not again been attracted thither: the destitution of the people has continued gradually to proceed, and at the present time that place is the poorest of the twenty-five townships comprising the Bolton Union; nearly one-fourth of its population are paupers; and the reduced state of the farmers may be estimated from the fact, that very many of them cannot pay their rents in full, and that some of them pay instalments as low as 5*s.* at once, in liquidation of their poor rates.

Next to the hundred of Salford, in wealth and importance, we find that the hundred of West Derby, that in which Liverpool is situate, has derived the largest amount of advantages from the introduction of manufactures, although itself but slightly engaged in them. At the time of the land-tax assessment, it was put down at 55,642*l.* At the present time, by the county assessment, it stands at 2,124,925*l.* being an advance at the rate of 3900 per cent.

Some idea may be formed of the rapid advance of the borough of Liverpool, from a comparison of the state of the Lancashire boroughs one hundred and fifty years ago; and also from the circumstance that it was then put down for the land-tax at a smaller sum than the borough of Wigan,—

	£	s.	d.
Wigan being charged -	205	3	8
Liverpool - - -	168	13	10
Preston - - -	135	2	2
Lancaster - - -	67	15	3

Regarding the state of the country in a moral and religious point of view, some sort of idea may be formed from the following enumeration of the various places of worship.

	Places of Worship.			
	Episcopal.	Catholic.	Dissenters.	Total.
In South Lancashire.....	212	47	402	661
In North Lancashire.....	191	48	188	427
	403	95	590	1088

It has been thus shown that the landed property of the county (and it might be said that of the whole kingdom) has partaken largely of the advantages arising from the introduction of manufactures — that the lands even of the remotest districts have become largely increased in value — that within the hundred of Salford we do not observe that in any case there has been an increase of less than 1500 per cent., whilst in those places where manufactures have been established, the increase has been at almost every rate from 5000 to nearly 55,000 per cent.

The advantages derived from this vast increase of wealth have principally fallen into the hands of those by whose enterprise and industry the interests of our manufacturing power have mainly been directed. There are, however, a very large amount of substantial advantages which have accrued to the owners of the soil. Many of the ancient family estates are enjoying beneficial advantages resulting from these changes, which have been estimated in various amounts, from below 10,000*l.* to upwards of 30,000*l.* a year.

It may become matter of interest, to inquire, and to consider, by whose instrumentality this vast system of manufactures has been effected. It has not been the work of the *wealthy*, whether natives or foreigners. For it is a well-known fact, which has grown into a proverb in Manchester, that "if a stranger bring a fortune to Manchester, and embark it in trade, he loses it; but if he bring talent and industry, he makes a fortune." All this vast accumulation of wealth and national advantage has come from the well directed industry of the common mass of people — a people possessing little or no outward property, but richly endowed with those valuable qualities, persevering industry, intelligence, and enterprise. It has been the work of the hard hand and the stout heart. Other lands might boast a more genial climate, a more teeming soil, and a greater abundance of mineral treasures; but of Lancashire it may truly be said, in the words of its own poet—

Man is the nobler growth these realms supply,
And Souls are ripen'd in this Northern sky.

THE ELEMENTS.

ANCIENTLY it was thought there were but four Elements or simple bodies, namely, Earth, Fire, Air, and Water; the alchemists reduced these to three—Salt, Sulphur, and

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Mercury, to which Paracelsus added two more, which he called *phleghm* and *caput mortuum* (the water and earth of the more ancient philosophers). Modern chemistry has completely overthrown the whole of these theories, and shown us, not only that all the elementary bodies of the olden time are mere compounds, but that instead of four, or three, or five, the number of simple bodies is at least fifty-four. By simple bodies, however, the reader must understand only bodies which chemical analysis has not yet been able farther to divide or decompose; for it does not necessarily follow, because they have not been as yet decomposed, that they are actually undecomposable. The following is a List of these simple substances at the present time:—

Oxygen.	Sodium.	Cadmium.	Osmium.
Hydrogen.	Lithium.	Cermium.	Palladium.
Nitrogen.	Aluminum.	Chromium.	Platinum.
Chlorine.	Calcium.	Cobalt.	Rhodium.
Iodine.	Magnesium.	Columbium.	Silver.
Bromine.	Barium.	Copper.	Tellurium.
Fluorine.	Strontium.	Gold.	Tin.
Sulphur.	Glucinum.	Iridium.	Titanium.
Phosphorus.	Zirconium.	Iron.	Tungsten.
Selenium.	Thorium.	Lead.	Vanadium.
Carbon.	Yttrium.	Manganese.	Uranium.
Boron.	Antimony.	Mercury.	Zinc.
Silicium.	Arsenic.	Molybdenum.	
Potassium.	Bismuth.	Nickel.	

Although the simple or undecomposed bodies are so numerous, the great bulk of the vegetable world is composed but of three—oxygen, hydrogen, and carbon, and the animal world of the same three, with the addition of nitrogen. It has been further calculated, that one half of the habitable world is made up of oxygen alone, for besides the important part which it plays in the vegetable and animal kingdoms, it forms half of all the water of the globe, about one fourth of its atmosphere, and enters more or less into the composition of every earth and stone.

TABLE OF THE BREAKING WEIGHT OF SEVERAL SUBSTANCES.

According to Muschenbroek's Experiments.

	Weight in lbs. that will break asunder a prism 1 in. square.		Weight in lbs. that will break asunder a prism 1 in. square.
Bar Steel, razor temper	150,000	Ivory	16,470
Ditto, soft	120,000	Tin Plate (tin 4, lead 1, zinc 1)	13,000
Bar Iron, best Swedish	84,000	Block Tin (tin 3, lead 1)	10,200
Ditto, ordinary	68,000	Horn	8,750
Copper, Swedish (3 parts copper with 1 tin)	64,000	Whalebone	7,500
Brass, good	51,000	Cast Tin, grain	6,500
Cast Iron	50,500	Ditto, English Block	5,200
Gold, with alloy of Tin 1 to 6	50,000	Lead, with Zinc in proportion of 8 to 1	4,500
Silver, with alloy of Copper 1 to 5	48,500	Bismuth	2,900
Cast Silver	41,000	Zinc	2,600
Copper, ordinary Swedish	37,000	Regulus of Antimony	1,000
Ditto, Anglesea	34,000	Cast Lead	860
Cast Gold	22,000		

According to Mr. Geo. Rennie's Experiments.

	Weight in lbs. that will break asunder a prism 1 in. square.		Length in feet, that will break with its own weight.
Cast Steel	134,256	—	39,455
Swedish Iron	72,064	—	19,740
English Iron	55,872	—	16,968
Cast Iron	19,096	—	6,110
Cast Copper	19,072	—	5,692
Yellow Brass	17,958	—	5,180
Cast Tin	4,736	—	1,496
Cast Lead	1,824	—	384
Good Hemp Rope	6,400	—	18,750
Ditto, 1 in. diameter	5,026	—	18,750

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NUMBERS USEFUL FOR READY REFERENCE.

Acre contains	43·560 sq. feet.
Cwt. of cast iron	430·25 cub. in.
— bar iron	397·60 —
— cast brass	368·88 —
— cast copper	352·41 —
— cast lead	272·80 —
Degree geographical	60 geog. m.
— do.	69·121 En. St. m.
— at the equator	365·144 feet.
Foot, cubic	1728 cub. in.
— square, surface measure	144 sq. in.
— long measure	12 lin. in.
Gallon, imperial	277·276 cub. in.
— old wine	231 —
— ale	282 —
Mile, geographical	6075·6 feet.
— English Statute	5280 —
Ounce of water	1·73298 cub. in.
— avoirdupois	437½ gr.
— troy	480 —
Pound, avoirdupois	7000 —
troy	5760 —

(The troy pound is less than the avoirdupois, in the proportion of 14 to 17 nearly; but the troy ounce is greater than the avoirdupois, in the proportion of 70 to 72 nearly.)

Ton of elm	64·460 cub. ft.
— Honduras mahogany	64·000 —
— Mar Forest fir	51·650 —
— Beech	51·494 —
— Riga fir	47·762 —
— Ash and Dantzic oak	47·158 —
— Spanish mahogany	42·066 —
— English oak	36·205 —
— Paving stone	14·835 —
— Granite	13·505 —
— Marble	13·070 —
— Chalk	12·874 —
— Limestone	11·273 —
Yard, cubic	27 cub. ft.
— square	9 sq. ft.
— lineal	3 lin. ft.

RATES OF POSTAGE.

All letters from one part of Great Britain to another (including the Local Penny Posts and the London Twopenny Post), are charged by weight as follows, if prepaid: —

Not exceeding ½ an ounce . . . . . 1*d.*
Exceeding ½ an ounce, and not exceeding 1 ounce . 2*d.*
——— 1 ounce ——— 2 ounces, 4*d.*
——— 2 ounces, ——— 3 ounces, 6*d.*

and so on at the rate of 2*d.* for every additional oz. or fraction of an oz.

Unpaid and unstamped letters, are charged double postage on delivery; letters insufficiently paid or stamped are charged double the amount of such insufficiency on delivery.

Letters or packets exceeding 16 ozs. in weight not forwarded — *except*,
Parliamentary petitions and addresses to Her Majesty,
Parliamentary proceedings,
Letters or packets addressed to, or received from, places beyond sea,
Letters or packets to and from public departments, and public officers heretofore franking by virtue of their office.

RECEIPT AND BILL STAMPS.

	£	s.	d.
Receipts for £5 and under £10	0	0	3
..... 10 20	0	0	6
..... 20 50	0	1	0
..... 50 100	0	1	6
..... 100 200	0	2	6
..... 200 300	0	4	0
..... 300 500	0	5	0
..... 500 1000	0	7	6
..... 1000 or upwards	0	10	0
Receipts in full of all demands	0	10	0

Bills and Promissory notes, not exceeding two months after date, or sixty days after sight.									For a longer period.		
If	£5	5		£20	0	£0	1	6	£0	2	0
Above	20	0		30	0	0	2	0	0	2	6
Above	30	0		50	0	0	2	6	0	3	6
Above	50	0		100	0	0	3	6	0	4	6
Above	100	0	and not	200	0	0	4	6	0	5	0
Above	200	0	exceeding	500	0	0	5	0	0	6	0
Above	300	0		500	0	0	6	0	0	8	6
Above	500	0		1000	0	0	8	6	0	12	6
Above	1000	0		2000	0	0	12	6	0	15	0
Above	2000	0		3000	0	0	15	0	1	5	0
Above	3000	0				1	5	0	1	10	0

*** Bills of exchange, accepted upon protest for honour, coming due on Sunday, Christmas Day, or Good Friday, are not payable till the day *after*, and not the day *before*, as was heretofore the case.

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TABLE

Exhibiting the DIFFERENCE OF TIME arising from DIFFERENCE IN LONGITUDE between the Observatory at Greenwich, and two or more principal places in each of the English Counties; also North and South Wales, Edinburgh, Dublin, and Paris.

N.B. *The letters* S. *and* F. *mean respectively Slow or Fast, and* W. *and* E. *West and East Longitude.*

		m.	s.	
Beds.....	Bedford	1	52	W. S.
	Leighton Buzzard	2	39	— —
Berks ...	Abingdon	5	7	— —
	Windsor.....	2	22	— —
Bucks...	Buckingham.....	3	57	— —
	Aylesbury	3	21	— —
Cambr..	Cambridge.....	0	23	E. F.
	Ely	1	4	— —
Chesh....	Chester 11		32	W. S.
	Macclesfield.....	8	30	— —
Cornw..	Falmouth 20		12	— —
	Truro.....20		6	— —
Cumb...	Carlisle.....11		38	— —
	Penrith.....10		56	— —
Derby..	Derby.....	5	52	— —
	Chesterfield.....	5	40	— —
Devon ..	Exeter.....14		18	— —
	Plymouth.....16		30	— —
Dorset..	Dorchester.....	9	43	— —
	Bridport 11		24	— —
Durh....	Durham.....	6	16	— —
	Darlington.....	6	12	— —
Essex ...	Colchester.....	3	32	E. F.
	Maldon	2	42	— —
	Chelmsford.....	1	52	— —
Glouc ...	Gloucester.....	8	58	W. S.
	Cheltenham.....	8	16	— —
Hants...	Southampton.....	5	36	— —
	Portsmouth	4	24	— —
Heref...	Hereford 10		52	— —
	Leominster 10		54	— —
Herts....	Hertford.....	0	16	— —
	Tring	2	38	— —
Hunts...	Huntingdon.....	0	45	— —
	Kimbolton.....	1	37	— —
Kent	Greenwich Observ.	0	0	— —
	Dover.....	5	16	E. F.
	Tunbridge Wells...	1	1	— —
Lanc.....	Lancaster..... 11		10	W. S.
	Manchester	9	0	— —
	Liverpool 11		53	— —
Leicest.	Leicester.....	4	33	— —
	Melton Mowbray...	3	33	— —
Lincoln	Lincoln.....	2	4	— —
	Louth	0	0	— —
Middle- sex.	St. Paul's	0	23	— —
	Hampton Court	1	20	— —

		m.	s.	
Monm..	Monmouth.....10		48	W. S.
	Abergavenny.....12		0	— —
Norf....	Norwich.....	5	12	E. F.
	Fakenham.....	3	24	— —
North- ampt.	Northampton.....	3	56	W. S.
	Peterborough.....	0	58	— —
North- umb.	Alnwick	6	48	— —
	Newcastle.....	6	24	— —
Notts....	Nottingham.....	4	41	— —
	Retford	3	25	— —
Oxford .	Oxford	5	1	— —
	Chipping Norton...	6	12	— —
Rutland.	Oakham.....	3	20	— —
Salop....	Shrewsbury.....10		56	— —
	Oswestry.....12		8	— —
Somer- set.	Taunton.....12		21	— —
	Bath.....	9	26	— —
Stafford	Stafford.....	8	40	— —
	Lichfield.....	7	18	— —
	Tamworth.....	6	49	— —
Suffolk..	Ipswich.....	4	38	E. F.
	Bury St. Edmund's	2	53	— —
Surrey..	Guildford.....	2	18	W. S.
	Croydon	0	26	— —
Sussex..	Brighton.....	0	32	— —
	Hastings.....	2	20	E. F.
Warw...	Warwick.....	6	20	W. S.
	Birmingham.....	7	33	— —
	Coventry.....	6	1	— —
West- morl.	Kendal.....11		0	— —
	Appleby 10		0	— —
Wilts....	Marlborough.....	6	53	— —
	Devizes.....	7	55	— —
Wor- cester.	Worcester.....	8	41	— —
	Kidderminster.....	8	58	— —
Yorks...	Beverley	1	42	— —
	York.....	4	24	— —
	Leeds.....	6	4	— —
North Wales.	Holyhead.....18		36	— —
	Bangor 16		14	— —
South Wales.	Cardigan.....18		40	— —
	Carmarthen.....17		16	— —
Edinburgh		12	43	— —
Dublin		25	21	— —
Paris		9	21	E. F.

*** The above Table has been calculated by Edward J. Dent, Esq., F.R.A.S., the eminent Chronometer maker to Her Majesty, and is extracted, by his kind permission, from a Treatise by him on the Construction of Chronometers, Watches, and Clocks. The computations of Mr. Dent are carried out to several places of decimal notation; but, for the general use of this Table, it has not been thought necessary to go beyond minutes and seconds.

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ROYAL FAMILY OF GREAT BRITAIN.

THE QUEEN. — VICTORIA, (daughter of the Duke of Kent, fourth son of George III.) *born*, 24 May 1819; succeeded to the throne, 20 June 1837; *married*, His Royal Highness Prince Albert of Saxe Coburg and Gotha, 10 Feb. 1840.

QUEEN DOWAGER. — Amelia Adelaide Louisa Theresa, widow of William IV., and sister to the reigning Duke of Saxe Meiningen, *born*, 15 Aug. 1792; *married*, 11 July 1818; crowned, 8 Sept. 1831.

His Royal Highness Francis Albert Augustus Charles Emanuel, Duke of Saxe, Prince of Coburg and Gotha, K.G., Consort of Her Majesty, *b.* 26 Aug. 1819.

Her Royal Highness Victoria Adelaide Mary Louisa, PRINCESS ROYAL, *b.* 21 Nov. 1840.

His Royal Highness, Albert Edward, PRINCE OF WALES and DUKE OF CORNWALL, *b.* Nov. 9. 1841.

Ernest Augustus, King of Hanover, DUKE OF CUMBERLAND and TEVIOTDALE, uncle to her Majesty, *b.* 5 June 1771; *m.* 29 Aug. 1815. Issue, George Frederick.

Augustus Frederick, DUKE OF SUSSEX, uncle to her Majesty, *b.* 27 Jan. 1773.

Adolphus Frederick, DUKE OF CAMBRIDGE, uncle to her Majesty, *b.* 24 Feb. 1774; *m.* 7 May 1818. Issue, George William, Augusta Caroline, and Mary Adelaide.

MARY, aunt to her Majesty, *b.* 25 April 1776; *m.* 22 July 1816, her cousin, the Duke of Gloucester, *dec.*

SOPHIA, aunt to her Majesty, *b.* 3 Nov. 1777.

Victoria Mary Louisa, DUCHESS OF KENT, mother of the Queen, *b.* 17 Aug. 1786; *m.* in 1818 the Duke of Kent, who *d.* 23 Jan. 1820.

Augusta Wilhelmina Louisa, DUCHESS OF CAMBRIDGE, niece of the Landgrave of Hesse, *b.* 25 July 1797; *m.* in 1818 the Duke of Cambridge, by whom she has issue.

SOPHIA MATILDA OF GLOUCESTER, second cousin to her Majesty, *b.* 29 May 1773.

George Frederick Alexander Ernest Augustus, only child of the Duke of Cumberland, *b.* 27 May 1819.

George William Frederick Charles, son of the Duke of Cambridge, *b.* 26 March 1819.

Augusta Caroline Charlotte Elizabeth Mary Sophia Louisa, daughter of the Duke of Cambridge, *b.* 19 July 1822.

Mary Adelaide Wilhelmina Eliz., daughter of the Duke of Camb, *b.* 27 Nov. 1833.

HER MAJESTY'S CABINET MINISTERS.

First Lord of the Treasury (*Prime Minister*), Rt. Hon. Sir Robert Peel.
Lord High Chancellor, Lord Lyndhurst.
Chancellor of the Exchequer, Rt. Hon. Henry Goulburn.
Pres. of the Council, Lord Wharncliffe.
Lord Priny Seal, Duke of Buccleuch.
Secretary of State for Home Depart., Right Hon. Sir James Graham, Bart.
Sec. for Foreign Aff., Earl of Aberdeen.
Secretary for the Colonies, Lord Stanley.
First Lord of the Admiralty, Earl of Haddington.
Commander in Chief, The Duke of Wellington.
President Board of Control, Lord Fitzgerald and Vesci.
Pres. of the Board of Trade, Earl of Ripon.
Sec. at War, Rt. Hon. Sir Henry Hardinge.
Treasurer of the Navy, and Paymaster-General of the Forces, Right Hon. Sir Edward Knatchbull, Bart.

CHIEF OFFICERS OF STATE NOT OF THE CABINET.

First Commissioner of Woods and Forests, Earl of Lincoln.
Chanc. Duchy Lanc., Lord Gran Somerset.
Lord Lieuten. of Ireland, Earl de Grey.
Chief Secretary for Ireland, Lord Eliot.
Lord Chancellor of Ireland, Sir Edward Sugden.
Postmaster-General, Lord Lowther.
Master-Gen. of Ordnance, Sir G. Murray.
Gov.-Gen. of India, Lord Ellenborough.
Governor-General of North American Provinces, Sir Charles Bagot.
Lord Great Chamb., Lord W. D'Eresby.
Lord Cham. of the Household, Earl Delawar.
Lord Steward, Earl of Liverpool.
Master of the Horse, Earl of Jersey.
Earl Marshal, Duke of Norfolk.
Attorney-General, Sir Frederick Pollock.
Solicitor-General, Sir William Follett.
Judge-Advocate, Rt. Hon. J. Nicoll, D.C.L.

COURTS OF LAW.

COURT OF CHANCERY.

Lord Chancellor, Lord Lyndhurst.
Master of the Rolls, Lord Langdale.
Vice-Chan. of England, Sir L. Shadwell.
Vice-Chancellors, J. L. Knight Bruce, Esq.; and James Wigram, Esq.

COURT OF QUEEN'S BENCH.

Lord Chief Justice, Lord Denman.
Judges, Sir John Patteson. Sir J. Williams. Sir J. T. Coleridge. Sir W. Wightman.

COURT OF COMMON PLEAS.

Ch. Justice, Sir Nicolas Conyngham Tindal.
Judges, Sir John Coltman. Right Hon. Sir Thos. Erskine. Sir W. H. Maule. Sir Cresswell Cresswell.

COURT OF EXCHEQUER.

Lord Chief Baron, Lord Abinger.
Barons, Sir J. Gurney. Sir J. Parke. Sir E. H. Alderson. Sir R. M. Rolfe.
Cursitor Baron, George Bankes, Esq.

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HOUSE OF LORDS,

[The Peers are inserted in the order of their precedence, which is regulated by the dates of their respective elevations, to the highest rank, which they hold in the English Peerage.]

Speaker—Right Hon. Lord Lyndhurst, Lord High Chancellor.

PEERS OF THE BLOOD ROYAL, 3.

	Created.
Ernest Augustus, Duke of Cumberland and Teviotdale (King of Hanover)	1799
Augustus Frederick, Duke of Sussex	1801
Adolphus Frederick, Duke of Cambridge	1801

DUKES, 21.

Norfolk.	St. Albans.	Rutland.	Dorset.	Buckingham and Chandos.
Somerset.	Leeds.	Brandon (*Hamilton*).	Newcastle.	Sutherland.
Richmond.	Bedford.	Portland.	Northumberland.	Cleveland.
Grafton.	Devonshire.	Manchester.	Wellington.	
Beaufort.	Marlborough.			

MARQUESSES, 20.

Winchester.	Bath.	Exeter.	Cholmondeley.	Ailsa.
Lansdowne.	Abercorn.	Northampton.	Hastings.	Breadalbane.
Townshend.	Hertford.	Camden.	Ailesbury.	Westminster
Salisbury.	Bute.	Anglesey.	Bristol.	Normanby.

EARLS, 116.

Shrewsbury.	Plymouth.	Fitzwilliam.	Rosslyn.	Somers.
Derby.	Scarborough.	Egremont.	Craven.	Stradbroke.
Huntingdon.	Albemarle.	Guildford.	Onslow.	Vane (*Londonderry*).
Pembroke and Montgomery.	Coventry.	Cornwallis.	Romney.	Amherst.
Devon.	Jersey.	Hardwicke.	Chichester.	Cawdor.
Suffolk & Berks.	Poulett.	Ilchester.	Wilton.	Munster.
Denbigh (*Desmond*).	Oxford and Mortimer.	Delawar.	Powis.	Burlington.
Westmoreland.	Ferrers.	Radnor.	Nelson.	Camperdown.
Lindsey	Dartmouth.	Spencer.	Manvers.	Lichfield.
Stamford and Warrington.	Tankerville.	Bathurst.	Orford.	Durham.
Winchelsea and Nottingham.	Aylestord.	Hillsborough (*Downshire*).	Grey.	Ripon.
Chesterfield.	Cowper.	Clarendon.	Lonsdale.	Granville.
Thanet.	Stanhope.	Abergavenny.	Harrowby.	Howard of Effingham
Sandwich.	Harborough.	Talbot.	Harewood.	Ducie.
Essex.	Macclesfield.	Minto.	Minto.	Yarborough.
Cardigan.	Pomfret.	Strange (*Athol*).	Cathcart.	Leicester.
Carlisle.	Graham (*Montrose*).	Verulam.	Verulam.	Innes (*Roxburgh*).
Doncaster (*Buccleuch*).	Waldegrave.	Mount Edgecumbe.	Brownlow.	Lovelace.
Shaftesbury.	Ashburnham.	Fortescue.	St. Germains.	Zetland.
Berkeley.	Harrington.	Digby.	Morley.	Auckland (*Eden*).
Abingdon.	Portsmouth.	Beverley.	Bradford.	Gainsborough.
	Brooke and Warwick.	Mansfield.	Beauchamp.	Fitzharding.
	Buckinghamsh.	Carnarvon.	De Grey.	
		Liverpool.	Eldon.	
		Cadogan.	Falmouth.	
		Malmesbury.	Howe.	

VISCOUNTS, 21.

Hereford.	Maynard.	Sidmouth.	Hutchinson—*Donoughmore*.	Canning.
Bolingbroke & St. John.	Sydney.	Lake.	Beresford.	Canterbury.
Torrington.	Hood.	Gordon—*Aberdeen*.	Clancarty.	Ponsonby of Imokilly.
Leinster.	St. Vincent.	Exmouth.	Combermere.	Hill.
	Melville.			

BARONS, 214.

De Ros.	Berners.	St. John of Bletsoe.	Clifton (Darnley).	Boyle (Cork and Orrery).
Audley.	Willoughby de Broke.	Howard de Walden.	Dormer.	Hay (Kinnoul).
Clinton.	Vaux of Harrowden.	Grey of Groby.	Teynham.	Middleton.
Dacre.	Paget (E. of Uxbridge).	Saye and Sele.	Stafford.	Monson.
Willoughby d'Eresby.		Petre.	Byron.	Montford.
Camoys.		Arundel.	Ward.	Bruce.
Stourton.			Clifford of Chudley.	

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Ponsonby (Besborough).
Sondes.
Scarsdale.
Boston.
Holland.
Lovell (Egmont)
Vernon.
Sundridge and Hamilton (Argyll).
Hawke.
Foley.
Dynevor.
Walsingham.
Bagot.
Southampton.
Grantley.
Rodney.
Carteret.
Berwick.
Sherborne.
Montagu.
Tyrone (Waterford).
Carleton (Shannon).
Suffield.
Dorchester.
Kenyon.
Braybrooke.
Fisherwick (Donegal).
Douglas.
Gage.
Thurlow.
Lyttleton.
Mendip and Dover.
Stuart (Moray).
Stewart of Garlies(Galloway).
Saltersford (Courtown).
Brodrick (Middleton).
Calthorpe.
Dunstanville.
Carrington.
Bayning.
Bolton.
Wodehouse.
Northwick.
Lilford.
Ribblesdale.
Fitz-Gibbon (Clare).
Moore (Drogheda).
Loftus (Ely).
Carysfort.
Alvanley.
Abercromby.
Rivers.
Redesdale.
Ellenborough.
Sandys.
Arden.
Rendlesham.
Erskine.
Monteagle (Sligo).
Ardrossan (Eglinton).
Lauderdale.
Granard.
Crewe.
Gardner.
Manners.
Hopetown and Niddry.
Lynedoch.
Dalhousie.
Meldrum (Aboyne).
Ross (Glasgow).
Grinstead (Enniskillen).
Foxford (Limerick).
Churchill.
Melbourne.
Harris.
Prudhoe.
Colchester.
Kerr (Lothian).
Minster (Conyngham).
Ormonde.
Wemyss.
Clanbrassil (Roden).
Kingston.
Silchester (Longford).
Glenlyon.
Maryborough.
Oriel (Ferrard).
Ravensworth.
Delamere.
Forester.
Rayleigh.
Bexley.
Gifford.
Penshurst (Strangford).
Tadcaster (Thomond).
Somerhill (Clanricarde).
Wigan (Balcarras).
Ranfurly.
De Tabley.
Wharncliffe.
Feversham.
Seaford.
Fitzgerald and Vesci.
Lyndhurst.
Fife.
Tenterden.
Plunkett.
Melrose (Haddington).
Cowley.
Stuart de Rothsay.
Heytesbury.
Roseberry.
Clanwilliam.
Skelmersdale.
Wallace.
Wynford.
Brougham and Vaux.
Kilmarnock (Errol).
Fingall.
Sefton.
Clements (Leitrim).
Rossie (Kinnaird).
Dunmore.
Ludlow.
Hamilton (Belhaven).
Howden.
Panmure.
Poltimore.
Kenlis (Headfort).
Chaworth (Meath).
Mostyn.
Templemore.
Dinorben.
Cloncurry.
De Saumarez.
Godolphin.
Hunsdon (Falkland).
Western.
Denman.
Duncannon.
Fitzgerald and Desmond.
Abinger.
De L'Isle and Dudley.
Ashburton.
Glenelg.
Hatherton.
Strafford.
Warlingham (Gosford).
Cottenham.
Langdale.
Portman.
Lovat.
Bateman.
Charlemont.
Kintore.
Lismore.
Carew.
De Mawley.
Wrottesley.
Sudeley.
Methuen.
Bruce.
Beauvale.
Furnival (Talbot de Malahide).
Stuart de Decies.
Leigh.
Wenlock.
Lurgan.
Colborne.
De Freyne.
Dunfermlin
Monteagle (Rice).
Seaton.
Keane.
Beaumont (Stapleton) *Rev.*
Hastings (Astley) *Rev.*
Ennishowen and Carrickfergus.
Kenmare.
Oxenford.
Surrey.
Campbell.
Congleton.
Lowther.
Vivian.

ARCHBISHOPS AND BISHOPS, 26.

	Cons.	*Trs.*
Dr. William Howley, Lord Archbishop of Canterbury	1813	1828
Hon. Dr. Ed. Vernon Harcourt, Lord Archbishop of York	1791	1801

Right Hon. Dr. Charles James Blomfield	London.
Dr. Edward Maltby	Durham.
Dr. Charles Richard Sumner	Winchester.
Dr. George Henry Law	Bath and Wells.
Dr. John Kaye	Lincoln.
Dr. William Carey	St. Asaph.*
Dr. Christopher Bethell	Bangor.*
Dr. George Murray	Rochester.
Hon. Dr. Hugh Percy	Carlisle.
Dr. Edward Copleston	Llandaff.
Dr. John Bird Sumner	Chester.
Dr. Richard Bagot	Oxford.
Dr. Henry Phillpotts	Exeter.
Dr. James Henry Monk	Gloucester and Bristol.
Dr. Joseph Allen	Ely.
Dr. Charles Thomas Longley	Ripon.
Dr. E. Denison	Salisbury.
Dr. Edward Stanley	Norwich.
Dr. Thomas Musgrave	Hereford.
Dr. George Davys	Peterborough.
Dr. James Bowstead	Lichfield and Coventry.
Dr. Connop Thirlwall	St. David's.
Dr. Henry Pepys	Worcester.
Dr. A. T. Gilbert	Chichester.
Dr. Thos. V. Short (not a Peer)	Sodor and Man.

* St. Asaph and Bangor are, on the next vacancy in either See, to be united.

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IRISH REPRESENTATIVE PRELATES, 4.

Archbishop of Dublin, and Bishops of Ferns, Down, and Cloyne.

REPRESENTATIVE PEERS.

FOR SCOTLAND, 16. — ELECTED AT THE COMMENCEMENT OF EACH PARLIAMENT

Titles.	*Titles.*	*Titles.*
Marq. Tweeddale.	Earl Orkney.	Baron Sinclair.
Earl Morton.	Viscount Arbuthnot.	Baron Colville of Culross.
Earl Seafield.	Viscount Strathallan.	Lord Reay.
Earl Airlie.	Baron Forbes.	Lord Rollo.
Earl Leven & Melville.	Baron Saltoun and Abernethy.	(One vacant.)
Earl Selkirk.		

FOR IRELAND, 28. — ELECTED FOR LIFE.

Titles.	*Titles.*	*Titles.*
Marq. Thomond.	Earl Limerick. (Foxford.)	Baron Dunsany — *Plunket.*
Marq. Westmeath	Earl Charleville.	Baron Blaney.
Earl Caledon.	Earl of Gosford.	Baron Carbery — *Freke.*
Earl Mountcashel.	Earl Glengall.	Baron Clonbrock — *Dillon.*
Earl Doneraile.	Vt. Lorton—*King.*	Baron Crofton.
Earl Mayo.	Vt. Gort—*Vereker.*	Baron Farnham.
Earl Wicklow.	Viscount Hawarden — *Maude.*	Baron Dunally — *Prittie.*
Earl of Dunraven.	Visct. de Vesci.	Baron Castlemaine.
Earl of Lucan.		Baron Downes—*Burgh.*
Earl of Bandon.		(One vacant.)

HOUSE OF COMMONS. — ELECTED AUGUST, 1841.

(FOURTH REFORMED HOUSE.)

Speaker — Right Hon. Charles Shaw Lefevre.

ENGLAND AND WALES.

For Counties, 159; Universities, 4; Cities and Boroughs, 337 — Total, 500.

Abingdon, T. Duffield.
Albans, St., G. W. Repton, Earl of Listowel.
Andover, R. Etwall, Lord W. Paget.
Angleseyshire, Hon. W. O. Stanley.
Arundel, Earl of Surrey.
Ashburton, W. Jardine.
Ashton-under-Lyne, C. Hindley.
Aylesbury, C. J. B. Hamilton, R. R. Clayton.
Banbury, H. W. Tancred.
Barnstaple, F. Hodgson, Montague Gore.
Bassetlaw, Hon. A. Duncombe, G. H. Vernon.
Bath, Visct. Duncan, J. A. Roebuck.
Beaumaris, &c., Captain F. Paget.
Bedfordshire, Lord Alford, W. Astell.
Bedford, Capt. Polhill, H. Stuart.
Berkshire, R. Palmer, Lord Barrington, P. Pusey.
Berwick-on-Tweed, Richard Hodgson, M. Forster.
Beverley, J. W. Hogg, J. Towneley.
Bewdley, Sir T. E. Winnington, Bart.
Birmingham, J. Scholefield, G. F. Muntz.
Blackburn, W. Feilden, J. Hornby.
Bodmin, Earl of Leicester (a seat vacant).
Bolton, P. Ainsworth, Dr. J. Bowring.
Boston, Sir J. Duke, J. S. Brownrigg.
Bradford, W. Busfield, sen., J. Hardy.
Breconshire, Col. T. Wood.
Brecon, C. M. E. Morgan.
Bridgenorth, T. C. Whitmore, Sir Robert Pigot, Bart.
Bridgewater, H. Broadwood, T. S. Forman.
Bridport, A. D. Cochrane, T. A. Mitchell.
Brighton, Capt. Pechell, Lord A. Hervey.
Bristol, P. W. Miles, Hon. F. Berkeley.
Buckinghamshire, Hon. W. E. Fitzmaurice, Col. Geo. Du Pré, C. R. S. Murray.
Buckingham, Sir T. Fremantle, Sir J. Chetwode, Bart.
Bury, R. Walker.
Bury St. Edmunds, Lord Charles Fitzroy, Earl Jermyn.
Calne, Earl of Shelburn.
Cambridgeshire, E. T. Yorke, R. J. Eaton, P. Allix.
Cambridge University, Rt. Hon. H. Goulburn, Hon. C. E. Law.
Cambridge, Sir Alex. Grant, Hon. J. H. Manners Sutton.
Canterbury, J. Bradshaw, Hon. G. P. S. Smythe.
Cardiff, &c., Right Hon. J. Nicoll, D.C.L.
Cardiganshire, Col. W. E. Powell.
Cardigan, &c., Pryse Pryse.

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Carlisle, P. H. Howard, W. Marshall.
Carmarthensh., Col. Rice Trevor, J. Jones.
Carmarthen, D. Morris.
Carnarvonshire, Hon. E. G. Pennant.
Carnarvon, W. B. Hughes.
Chatham, Rt. Hon. Capt. Byng.
Cheltenham, Captain C. F. Berkeley.
Cheshire (N.), W. T. Egerton, G. C. Legh.
Cheshire (S.), Sir P. Grey Egerton, J. Tollemache.
Chester, Lord R. Grosvenor, John Jervis.
Chichester, J. A. Smith, Lord Arthur Lennox.
Chippenham, Jos. Neeld, Rt. Hon. H. G. Boldero.
Christchurch, Right Hon. Sir George Rose.
Cirencester, W. Cripps, Colonel Master.
Clitheroe, E. Cardwell.
Cockermouth, H. A. Aglionby, Edward Horsman.
Colchester, R. Sanderson, Sir G. H. Smyth.
Cornwall (E.), Lord Eliot, W. Rashleigh.
Cornwall (W.), E. W. W. Pendarves, Sir C. Lemon, Bart.
Coventry, Rt. Hon. Edward Ellice, W. Williams.
Cricklade, John Neeld, Hon. H. Howard.
Cumberland (E.), Hon. C. Howard, W. James.
Cumberland (W.), E. Stanley, S. Irton.
Dartmouth, Sir John Seale, Bart.
Denbighshire, Hon. W. Bagot, Sir W. Wynn, Bart.
Denbigh, T. Mainwaring.
Derbyshire (N.), Hon. G. H. Cavendish, W. Evans.
Derbyshire (S.), E. M. Mundy, C. R. Colville.
Derby, Edward Strutt, Hon. J. B. Ponsonby.
Devizes. G. H. W. Heneage, T. H. S. Sotheron.
Devonport, Sir G. Grey, Bart., Henry Tuffnell.
Devonshire (N.), Will. Buck, Sir T. Dyke Acland.
Devonshire (S.), Sir J. Y. Buller, Bart., Lord Courtenay.
Dorchester, Hon. A. H. Ashley Cooper, Rt. Hon. Sir J. Graham.
Dorsetshire, Lord Ashley, H. C. Sturt, G. Bankes.
Dover, Hon. E. Rice, Sir J. R. Reid.
Droitwich, J. S. Pakington.
Dudley, T. Hawkes.
Durham (N.), H. Lambton, Hon. H. T. Liddell.
Durham (S.), Lord H. Vane, J. Bowes.
Durham City, T. C. Granger, R. Fitzroy.
Essex (N.), Sir J. T. Tyrell, Bart., C. G. Round.
Essex (S.), T. W. Bramston, G. Palmer.
Evesham, Lord A. M. C. Hill, P. Borthwick.
Exeter, E. Divett, Sir W. W. Follett.
Eye, Sir E. Kerrison, Bart.
Falmouth and Penryn, J. C. W. Vivian, J. H. Plumridge.
Finsbury, T. Wakley, T. S. Duncombe.
Flintshire, Sir G. S. R. Glynn, Bart.
Flint, &c., Sir R. B. W. Bulkeley, Bart.
Frome, T. Sheppard.
Gateshead, W. Hutt.
Glamorganshire, Lord Adare, C. M. R. Talbot.
Gloucestershire (E.), Hon. C. W. Codrington, F. Charteris.
Gloucestershire (W.), Hon. Grantley Berkeley, R. B. Hale.
Gloucester, J. Phillpotts, Hon. M. F. Berkeley.
Grantham, G. E. Welby, Hon. F. Tollemache.
Great Grimsby, E. Heneage.
Greenwich, E. G. Barnard, J. W. D. Dundas.
Guildford, C. B. Wall, R. D. Mangles.
Halifax, E. Protheroe, Charles Wood.
Hampshire (N.), Sir W. Heathcote, Rt. Hon. C. S. Lefevre.
Hampshire (S.), Lord C. Wellesley, H. C. Compton.
Harwich, T. Attwood, W. Beresford.
Hastings, Rt. Hon. J. Planta, R. Hollond.
Haverfordwest, &c., Sir R. B. Phillips, Bt.
Helston, Sir R. R. Vyvyan.
Herefordshire, K. Hoskins, T. B. Baskerville, J. Bailey.
Hereford, E. B. Clive, Rob. Pulsford.
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Hertford, Hon. W. F. Cowper, Lord Mahon.
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Horsham, Hon. R. C. Scarlett.
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Hull, Sir W. James, Sir T. Hanmer.
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Huntingdon, Col. Peel, Sir F. Pollock.
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Leicestershire (S.), H. Halford, C. W. Packe.
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Leominster, C. Greenaway, G. Arkwright.
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Lymington, W. A. Mackinnon, J. Stewart.
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Suffolk (West), Colonel Rushbrooke, H. S. Waddington.
Sunderland, Visc. Howick, D. Barclay.
Surrey (East), H. Kemble, E. Antrobus.
Surrey (West), W. J. Denison, J. Trotter.
Sussex (East), G. Darby, A. E. Fuller.
Sussex (West), Earl of March, C. Wyndham.
Swansea, J. H. Vivian.
Tamworth, Rt. Hon. Sir R. Peel, Captain A'Court.

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Tiverton, J. Heathcoat, Lord Palmerston.
Totnes, B. Baldwin, Lord Seymour.
Tower Hamlets, Sir W. Clay, C. R. Fox.
Truro, E. Turner, J. E. Vivian.
Tynemouth, H. Metcalfe.
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Woodstock, Fred. Thesiger.
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Worcestershire (West), Hon. H. B. Lygon, F. W. Knight.
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Yorkshire (W. R.), Hon. J. Stuart Wortley, E. Denison.
Yorkshire (N. R.), Hon. O. Duncombe, E. S. Cayley.
York, J. H. Lowther, H. R. Yorke.

SCOTLAND.

County Members, 30; Cities and Boroughs, 23 — Total, 53.

Aberdeen, County, Hon. Captain Gordon.
Aberdeen, A. Bannerman.
Andrew's, St. Cupar, &c., E. Ellice, jun.
Argyll, County, W. F. A. Campbell.
Ayr, County, Lord Kelburne.
Ayr, &c., Lord James Stuart.
Banff, County, General Duff.
Berwick, County, Sir H. P. Campbell, Bt.
Bute, County, (vacant).
Caithness, County, G. Trail.
Clackmannan and Kinross, Gen. Morrison.
Dumbarton, County, A. Smollett.
Dumfries, County, J. J. H. Johnstone.
Dumfries, &c., W. Ewart.
Dundee, G. Duncan.
Dysart, Kirkaldy, &c., R. Ferguson.
Edinburgh, County, W. R. Ramsay.
Edinburgh, Rt. Hon. T. B. Macaulay, W. G. Craig.
Elgin and Nairn Counties, C. L. C. Bruce.
Elgin, &c., Sir A. Leith Hay.
Fife, County, Captain J. Wemyss.
Forfar, County, Lord J. F. Gordon.
Glasgow, J. Oswald, J. Dennistoun.
Greenock, R. Wallace.
Haddington, Co., Sir T. B. Hepburn, Bart.
Haddington, &c., J. M. Balfour.
Inverness, County, Hon. Jas. Baillie.
Inverness, Boroughs, Jas. Morrison.
Kincardine, County, Hon. H. Arbuthnot.
Kirkcudbright, Alex. Murray.
Kirkwall, Wick, &c., J. Loch.
Lanark, County, M. Lockhart.
Leith, Rt. Hon. Andrew Rutherfurd.
Linlithgow, County, Hon. Cha. Hope.
Linlithgow, &c., W. Baird.
Montrose, &c., J. Hume.
Orkney and Shetland, F. Dundas.
Paisley, A. Hastie.
Peebles, County, W. F. Mackenzie.
Perth, County, H. Home Drummond.
Perth, Rt. Hon. Fox Maule.
Renfrew, County, P. M. Stewart.
Renfrew, Kilmarnock, &c., A. Johnston.
Ross and Cromarty Shires, T. Mackenzie.
Roxburgh, County, Hon. F. Scott.
Selkirk, County, A. Pringle.
Stirling, County, W. Forbes.
Stirling, &c., Lord Dalmeny.
Sutherland, County, David Dundas.
Wigton, County, Capt. J. Dalrymple.
Wigton, &c., J. M'Taggart.

IRELAND.

County Members, 64; Universities, 2; Cities and Boroughs, 39 — Total, 105.

Antrim, County, J. Irving, N. Alexander.
Armagh, County, Viscount Acheson, Col. W. Verner.
Armagh, Lt. Col. Rawdon.
Athlone, D. H. Ferrall.
Bandonbridge, Viscount Barnard.
Belfast, J. E. Tennent, D. B. Ross.
Carlow, County, H. Bruen, T. Bunbury.
Carlow, B. V. Layard.
Carrickfergus, P. Kirk.
Cashel, Dr. Stock.
Cavan, County, J. Young, H. J. Clements.
Clare, County, Major M'Namara, C. O'Brien.
Clonmel, Rt. Hon. David Richard Pigot.
Coleraine, E. Litton.

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Cork, County, E. B. Roche, D. O'Connell.
Cork, F. S. Murphy, D. Callaghan.
Donegal, County, Sir E. S. Hayes, Col. E. M. Conolly.
Down, County, Lord Castlereagh, Lord Hillsborough.
Downpatrick, D. Ker.
Drogheda, Sir W. Somerville, Bart.
Dublin, County, J. H. Hamilton, T. E. Taylor.
Dublin, City, W. H. Gregory, E. Grogan.
Dublin University, Rt. Hon. F. Shaw (a seat vacant.)
Dundalk, T. Redington.
Dungannon, Viscount Northland.
Dungarvon, Rt. Hon. R. L. Sheil.
Ennis, H. Bridgman.
Enniskillen, Hon. A. H. Cole.
Fermanagh, M. Archdall, Sir A. R. Brooke.
Galway, County, T. Martin, J. J. Bodkin.
Galway, T. J. Blake, Bart., Sir V. Blake.
Kerry, County, M. J. O'Connell, Hon. W. Browne.
Kildare, County, R. M. O'Ferral, G. Archbold.
Kilkenny, County, Hon. P. Butler, G. Bryan.
Kilkenny, J. O'Connell.
King's County, Col. J. C. Westenra, A. Armstrong.
Kinsale, W. H. Watson.
Leitrim, County, Lord Clements, S. White.
Limerick, County, W. S. O'Brien, C. Powell.
Limerick, Sir D. Roche, Bart., J. O'Brien.
Lisburne, Captain Meynell.
Londonderry, County, Sir R. Bateson, Capt. T. Jones.
Londonderry, Sir R. A. Ferguson, Bart.
Longford, County, A. Lefroy, Col. H. White.
Louth, County, R. M. Bellew, Hon. T. V. Dawson.
Mallow, Sir C. D. O. Jephson Norreys.
Mayo, County, R. D. Browne, M. Blake.
Meath, Henry Grattan, M. E. Corbally.
Monaghan, County, E. P. Shirley (a seat vacant).
Newry, Viscount Newry.
New Ross, Hon. R. Gore.
Portarlington, Col. G. L. D. Damer.
Queen's County, Sir C. Coote, Hon. T. Vesey.
Roscommon, County, O'Conor Don, F. French.
Sligo, County, J. Ffolliott, W. R. O. Gore.
Sligo, J. P. Somers.
Tipperary, Hon. R. O. Cave, V. Maher.
Tralee, Maurice O'Connell.
Tyrone, County, Lord C. Hamilton, Hon. H. T. L. Corry.
Waterford, County, W. V. Stuart, Hon. R. S. Carew.
Waterford, W. Barron, T. Wyse.
Westmeath, County, B. J. Chapman, H. M. Tuite.
Wexford, County, James Power, V. F. Hatton.
Wexford, Sir Thos. Esmond, Bart.
Wicklow, County, Sir R. Howard, W. Acton.
Youghall, C. Cavendish.

CORPORATION OF LONDON.

Lord Mayor, Right. Hon. John Humphery, Alderman for the Ward of Aldgate.

Aldermen who have served the Office of Lord Mayor.

	Elected		Elected
Bridge Without...	Sir C.S. Hunter, Bt. 1804	Lime Street.....	C. Farebrother.....1826
Cripplegate.....	Sir M. Wood, Bt... 1807	Bishopgate	W. T. Copeland.... 1829
Coleman Street	Sir W. Heygate, Bt. 1812	Farringdon Within,	T. Kelly 1830
Billingsgate.....	A. Brown 1821	Castle Baynard ...	S. Wilson..... 1831
Cheap.....	W. Thompson..... 1821	Bridge Within	Sir C. Marshall ... 1833
Tower.....	M. P. Lucas..... 1821	Portsoken	Thomas Johnson... 1833
Langbourne.....	Sir John Key, Bart. 1823	Cornhill	.... Sir J. Pirie, Bt..... 1834
Aldersgate	Sir Peter Laurie... 1826		

Aldermen who have not served the Office of Lord Mayor.

Cordwainers.....	T. Wood..... 1835	Candlewick.....	Sir G. Carroll..... 1840
Bread Street.....	J. Lainson..... 1835	Farringdon Without.	Sir James Duke 1840
Vintry	W. Magnay 1838	Queenhithe	J. K. Hooper 1840
Walbrook.....	Mich. Gibbs 1838	Bassishaw.....	Thomas Farncombe 1841
Dowgate	John Johnson 1839	Broad Street	John Musgrove... 1842

Sheriffs, Alderman Hooper, and Jeremiah Pilcher, Esq.
Under Sheriffs, Messrs. Hardwick and Pilcher.

Recorder, Hon. C. E. Law, M.P.
Common Serjeant, J. Mirehouse, Esq.
Judge of Sheriffs' Court, E. Bullock, Esq.
Chamberlain, Sir J. Shaw, Bart.

Town Clerk, Serjt. Merewether.
Solicitor, Chas. Pearson, Esq.
Commissioner of Police, D. W. Harvey, Esq.
Remembrancer, E. Tyrrel, Esq.

BANK OF ENGLAND.

Governor, William Cotton, Esq.
Deputy-Governor, John B. Heath, Esq.
Twenty-four other Directors.

Secretary, J. Knight, Esq.
Chief Cashier, M. Marshall, Esq.

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THE

MECHANICS' ALMANACK

AND

ENGINEERS' YEAR BOOK

FOR

1844:

CONTAINING

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With Astronomical Memoranda for each Month;

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THE NEW ACT FOR REGISTRATION OF ARTICLES OF UTILITY,
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Price One Shilling.

CHRONOLOGICAL CYCLES, &c.		ECCLESIASTICAL FEASTS.	
Dominical Letters G F	Solar Cycle - - 5	Shrove Sun. Feb. 18	Holy Thursd. May 16
Golden Number - 2	No. of Direction 17	Midlent Sun. Mar. 17	Whit.-Sund. May 26
Epact - - 11	Julian Period 6557	Easter Day, Apr. 7	Trinity Sund. June 2
Sund. aft. Trinity - 25	Roman Indiction 2	Rogation Sun. May 12	Advent Sund. Dec. 1

ECLIPSES, &c., 1844.

Three of the Sun and *two* of the Moon.

I. *May* 31.—A *total* and visible eclipse of the Moon. The Moon rises in the afternoon at 7 h. 58 m.; the Sun sets at 8 h. 4 m.; eclipse begins at 9 h. 9 m.; total darkness begins at 10 h 11 m.; middle at 10 h. 50 m.; total darkness ends at 11 h. 28 m.; eclipse ends at 12 h. 31 m.

II. *June* 15.—A *partial* Eclipse of the Sun, not visible in Great Britain.

III. *November* 10.—Another *partial* Eclipse of the Sun, also invisible.

IV. *November* 24.—A *total* and visible Eclipse of the Moon, very favourable for observation. It begins in the evening at 9 h. 49 m.; total darkness begins at 10 h. 58 m.; middle of the eclipse at 11 h. 44 m.; total darkness ends at 12 h. 31 m.; eclipse ends at 1 h. 39 m. in the morning.

V. *December* 9.—A *partial* Eclipse of the Sun, invisible in Great Britain.

Mercury may be seen in the evenings, near the western horizon, soon after sunsetting, about *Jan.* 13., *May* 4., *Sept.* 1. and *Dec.* 26.; and in the mornings, shortly before sunrising, about *Feb.* 23., *June* 22., and *Oct.* 13.

*** For the other planets, see the astronomical memoranda, each month.

TABLE, showing the Illuminated Appearances of Venus and Mars.

Date.	Venus.	Mars.
Jan. 15	0·907	0·903
Feb 14	0·845	0·926
Mar. 15	0·761	0·947
Apr. 15	0·644	0·967
May 15	0·495	0·982
June 15	0·280	0·993
July 15	0·024	0·999
Aug. 15	0·142	1·000
Sept. 15	0·400	0·995
Oct. 15	0·569	0·985
Nov. 15	0·697	0·969
Dec. 15	0·793	0·949

The numbers given in this Table represent the versed sines of the illuminated portions of the Discs, the apparent Diameters of the Planets being considered as *unity*. These being traced and compared by observations on the planets with good telescopes, serve remarkably to confirm the truth of the solar system to young astronomers.

LAW TERMS for the YEAR 1844.

1. HILARY TERM *begins* Jan. 11., *ends* Jan. 31.; and *contains* 21 days.
2. EASTER TERM *begins* April 15., *ends* May 8.; and *contains* 24 days.
3. TRINITY TERM *begins* May 22., *ends* June 12.; and *contains* 22 days.
4. MICHAELMAS TERM *begins* Nov. 2., *ends* Nov. 25.; and *contains* 24 days.

*** By the stat. 1 Will. IV. cap. 3. sec. 2., it is enacted that all writs usually returnable before any of His Majesty's Courts of King's Bench, Common Pleas, and Exchequer respectively, on general Return Days, might, after the First day of *January*, 1831, be made returnable on the Third day exclusive before the commencement of each Term, or on any day, not being *Sunday*, between that day and the third day exclusive before the last day of the Term; and that the day for appearance should, as theretofore, be the Third day after the Return, exclusive of the Return day; or, in case such Third day should fall on a *Sunday*, then on the Fourth day after such Return, exclusive of the Return day. All other writs must, as before, be made returnable on a day in full Term.

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MOON'S QUARTERS.

☽ Full Moon, 5th day, at 5 h. 34 m. afternoon.
☾ Last Quarter, 12th day, at 9 h. 31 m. afternoon.
● New Moon, 19th day, at 6 h. 18 m. afternoon.
☽ First Quarter, 27th day, at 0 h. 31 m. afternoon.

☉ enters ♒ 20th day, at 9 h. 24 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	3	35	23 S.	4
7	12	6	20	22	27
13	12	8	47	21	35
19	12	10	52	20	28
25	12	12	31	19	6

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VIII	III.								
1	M	Circumcision	9	59	0 a	45	4 m	8	10	S	10	36
2	Tu		9	IV.	1	22	5	11	11	5	11	34
3	W	Saturn sets 5 13 aft.	8	1	2	9	6	8	—	—	0	3
4	Th	Jupiter sets 8 0 aft.	8	2	3	6	6	59	0	31	0	59
5	F		8	3	4	11	7	41	1	25	1	49
6	S	Epiphany. 12th Day	8	4	5	21	8	15	2	12	2	34
7	Sun	1 Sun. aft. Epiphany	7	5	6	37	8	43	2	54	3	13
8	M	Plough Monday. Lucian	7	7	7	54	9	6	3	32	3	51
9	Tu		6	8	9	11	9	27	4	9	4	27
10	W		6	10	10	29	9	47	4	46	5	5
11	Th	Hilary Term begins	5	11	11	48	10	7	5	25	5	46
12	F		5	12	morn.		10	29	6	8	6	33
13	S	Hil. Cam. T. begins	4	14	1	9	10	53	7	1	7	33
14	Sun	2 Sun. aft. Epiphany	3	15	2	29	11	25	8	9	8	50
15	M	Oxford Term begins	2	17	3	49	0 a	3	9	32	10	14
16	Tu	Mars sets 9 56 aft.	1	18	5	2	0	54	10	54	11	32
17	W		1	20	6	3	1	56	—	—	0	6
18	Th	Prisca	0	21	6	53	3	9	0	36	1	4
19	F		VII	23	7	30	4	27	1	30	1	55
20	S	Fabian	58	25	7	59	5	45	2	17	2	38
21	Sun	3 Sun. aft. Epiph. Agnes	57	27	8	21	7	1	2	57	3	15
22	M	Vincent	55	28	8	41	8	14	3	32	3	49
23	Tu	Venus sets 6 59 aft.	54	30	9	1	9	25	4	6	4	24
24	W		53	32	9	18	10	33	4	41	4	59
25	Th	Convers. of St. Paul	52	33	9	36	11	40	5	18	5	38
26	F	Mercury sets 5 28 aft.	50	35	9	55	morn.		5	59	6	21
27	S		49	37	10	19	0	47	6	44	7	9
28	Sun	4 Sun. aft. Epiphany	48	39	10	45	1	52	7	34	8	1
29	M		46	41	11	19	2	56	8	30	9	0
30	Tu	K. Char. I. mart. 1649.	45	42	0 a	0	3	56	9	31	10	2
31	W	Hilary Term ends	43	44	0	52	4	49	10	34	11	6

ASTRONOMICAL MEMORANDA.

2d day, Mercury in conjunction with Saturn; Sun in Perigee.
19th — Saturn in conjunction with the Sun and Moon.
20th — Mercury in conjunction with the Moon.
21st — Venus in conjunction with the Moon.
22d — Jupiter in conjunction with the Moon.
24th — Mars in conjunction with the Moon; Venus in conjunction with Jupiter.
29th — Mercury in inferior conjunction with the Sun.

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MOON'S QUARTERS.

○ Full Moon, 4th day, at 8h. 43 m. morning
☾ Last Quarter, 11th day, at 5 h. 22 m. morning.
● New Moon, 18th day, at 8 h. 46 m. morning.
☽ First Quarter, 26th day, at 9 h. 58 m. morning.

☉ enters ♓ 19th day, at 0 h. 1 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	13	50	17	S. 16
7	12	14	25	15	29
13	12	14	31	13	33
19	12	14	11	11	29
25	12	13	26	9	18

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises.		Sets.		High Water, London Bridge. Morn.		Aftern.	
			VII	IV	h	m	h	m	h	m	h	m
1	Th		42	46	1 a	53	5 m	35	11	35	—	—
2	F	Purif. Cand. Day	41	48	3	2	6	13	0	4	0	33
3	S	Blaise	39	49	4	16	6	45	1	0	1	25
4	Sun	Septuagesima Sunday	37	51	5	35	7	10	1	48	2	11
5	M	Agatha	36	53	6	54	7	32	2	33	2	52
6	Tu		34	55	8	14	7	53	3	11	3	30
7	W	Saturn rises 6 51 morn.	32	57	9	34	8	14	3	49	4	8
8	Th	Jupiter sets 6 28 aft.	30	59	10	56	8	35	4	27	4	47
9	F		29	v	morn.		8	59	5	9	5	32
10	S	Queen Vict. married	27	2	0	17	9	28	5	57	6	25
11	Sun	Sexagesima Sunday	25	4	1	37	10	4	6	55	7	28
12	M		23	6	2	51	10	50	8	4	8	43
13	Tu	Mars sets 10 2 aft.	21	8	3	55	11	47	9	22	10	0
14	W	Valentine	19	10	4	47	0 a	54	10	36	11	11
15	Th		17	12	5	28	2	8	11	44	—	—
16	F	Venus sets 8 16 aft.	15	13	6	1	3	25	0	14	0	41
17	S	Mercury rises 6 7 morn.	14	15	6	25	4	40	1	6	1	28
18	Sun	Shrove Sunday	12	17	6	46	5	53	1	49	2	8
19	M	[div. n.	10	19	7	5	7	5	2	27	2	45
20	Tu	Shrove Tuesday. C. T.	8	21	7	22	8	14	3	3	3	20
21	W	Lent begins Ash Wed.	6	22	7	41	9	22	3	36	3	53
22	Th	Saturn rises 5 57 morn.	4	24	8	1	10	30	4	11	4	29
23	F	Jupiter sets 5 50 aft.	2	26	8	22	11	37	4	48	5	7
24	S	Duke of Camb. born	vi	28	8	47	morn.		5	28	5	51
25	Sun	1 Sun. in Lent. St. Mat-	57	30	9	18	0	42	6	15	6	39
26	M	[thias	55	31	9	56	1	42	7	4	7	31
27	Tu	Mars sets 10 5 aft.	53	33	10	43	2	38	7	59	8	29
28	W	Ember Week	51	35	11	38	3	26	8	59	9	30
29	Th	Venus sets 8 55 aft.	49	37	0 a	43	4	6	10	0	10	31

ASTRONOMICAL MEMORANDA.

16th day, Mercury and Saturn in conjunction with the Moon.
19th — Jupiter in conjunction with the Moon.
21st — Venus in conjunction with the Moon.
22d — Mars in conjunction with the Moon.
29th — Jupiter in conjunction with the Sun.

Jupiter will be an *Evening Star* until March 1st; then a *Morning Star* until September 22d; and afterwards an *Evening Star* to the end of the year.

Venus will be an *Evening Star* until July 22d, then a *Morning Star* for the remainder of the year.

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MOON'S QUARTERS.

○ Full Moon, 4th day, at 9 h. 2 m. afternoon.
☾ Last Quarter, 11th day, at 1 h. 20 m. afternoon.
● New Moon, 19th day, at 0 h. 17 m. morning.
☽ First Quarter, 27th day, at 5 h. 2 m. morning.

☉ enters ♈ 20th day, at 11 h. 54 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′	
1	12	12	32	7	8.	26
7	12	11	11	5		7
13	12	9	36	2		46
19	12	7	51	0	S.	24
25	12	6	2	1	N.	58

M	D	W	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	MOON Rises. m	MOON Sets. h	MOON Sets. m	High Water, London Bridge. Morn. h	Morn. m	Aftern. h	Aftern. m
				VI	V								
1		F	David	47	38	1	a 53	4	m 42	11	3	11	35
2		S	Chad	45	40	3	8	5	9	—	—	0	4
3	Sun		2 Sunday in Lent	42	42	4	28	5	34	0	33	1	0
4		M		40	44	5	49	5	56	1	25	1	48
5		Tu	Saturn rises 5 13 morn.	38	45	7	10	6	18	2	9	2	29
6		W	Jupiter rises 6 34 morn	36	47	8	34	6	39	2	49	3	9
7		Th	Perpetua	33	49	9	59	7	3	3	29	3	49
8		F		31	51	11	22	7	31	4	10	4	38
9		S	Mars sets 10 7 aft.	29	52	morn.		8	7	4	57	5	29
10	Sun		3 Sunday in Lent	27	54	0	41	8	50	5	49	6	19
11		M		25	56	1	48	9	44	6	50	7	29
12		Tu	Gregory	22	58	2	45	10	48	7	56	8	31
13		W		20	59	3	28	11	59	9	7	9	42
14		Th	Venus sets 9 39 aft.	18	VI	4	3	1	a 14	10	15	10	47
15		F	Mercury rises 5 55 morn.	15	3	4	29	2	27	11	17	11	45
16		S	[St. Patrick	13	4	4	51	3	40	—	—	0	11
17	Sun		4th, or Midlent Sun.	11	6	5	11	4	51	0	35	0	57
18		M	Edw. K. W. Saxons	9	8	5	30	6	0	1	17	1	36
19		Tu		6	9	5	47	7	9	1	55	2	13
20		W	Saturn rises 4 17 morn.	4	11	6	6	8	16	2	31	2	48
21		Th	Benedict	2	13	6	27	9	22	3	6	3	24
22		F	Jupiter rises 5 38 morn.	v	14	6	51	10	27	3	42	4	1
23		S	Mars sets 10 10 aft.	57	16	7	19	11	30	4	20	4	40
24	Sun		5 Sunday in Lent	55	18	7	54	morn.		5	1	5	23
25		M	Annunc. or Lady-Day	53	19	8	37	0	27	5	47	6	12
26		Tu		50	21	9	28	1	18	6	38	7	4
27		W	Venus sets 10 19 aft.	48	23	10	28	2	1	7	31	7	58
28		Th		46	25	11	34	2	37	8	26	8	55
29		F	Cambridge Term ends	44	26	0	a 45	3	7	9	25	9	55
30		S	Oxford Term ends	41	28	2	1	3	32	10	27	11	0
31	Sun		Palm Sunday	39	29	3	19	3	56	11	32	—	—

ASTRONOMICAL MEMORANDA.

14th day, Saturn in conjunction with the Moon.
17th — Mercury and Jupiter in conjunction with the Moon.
20th — Spring quarter commences.
21st — Mercury in conjunction with Jupiter.
22d — Venus and Mars in conjunction with the Moon.
25th — Venus in conjunction with Mars.

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MOON'S QUARTERS.

☽ Full Moon, 3d day, at 6 h. 58 m. morning.
☾ Last Quarter, 9th day, at 10 h. 9 m. afternoon.
● New Moon, 17th day, at 4 h. 32 m. afternoon.
☽ First Quarter, 25th day, at 8 h. 17 m. afternoon.

☉ enters ♉ 20th day, at 0 h. 2 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	3	53	4 N.	42
7	12	2	6	6	59
13	12	0	28	9	11
19	11	59	2	11	19
25	11	57	50	13	19

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises.	MOON Sets.	High Water, London Bridge. Morn.	Aftern.
			V	VI	h m	h m	h m	h m
1	M		37	31	4 a 40	4 m 18	0 3	0 32
2	Tu	Saturn rises 3 29 morn.	34	33	6 4	4 40	0 59	1 24
3	W	Rich. Bp. of Chich.	32	35	7 31	5 3	1 47	2 9
4	Th	Maundy Th. St. Ambrose	30	36	8 57	5 31	2 31	2 52
5	F	Good Friday	28	38	10 20	6 4	3 13	3 36
6	S	Old Lady Day	25	40	11 35	6 45	3 59	4 23
7	Sun	Easter Sunday	23	41	morn.	7 37	4 48	5 14
8	M	Easter Monday	21	43	0 39	8 39	5 40	6 8
9	Tu	Easter Tuesday	19	44	1 27	9 49	6 37	7 7
10	W		17	46	2 3	11 5	7 37	8 9
11	Th	Jupiter rises 4 27 morn.	14	48	2 33	0 a 19	8 42	9 14
12	F	Mars sets 10 11 aft.	12	49	2 56	1 31	9 45	10 15
13	S		10	51	3 17	2 42	10 43	11 11
14	Sun	1st, or Low Sunday	8	53	3 36	3 52	11 37	— —
15	M	Easter Term begins	6	54	3 53	4 58	0 0	0 22
16	Tu		3	56	4 11	6 5	0 43	1 3
17	W	Oxf. and Camb. T. beg.	1	58	4 32	7 12	1 23	1 43
18	Th		iv	vii	4 56	8 18	2 1	2 19
19	F	Alphege	57	1	5 22	9 21	2 38	2 58
20	S	Venus sets 11 24 aft.	55	3	5 55	10 21	3 17	3 37
21	Sun	2 Sun. aft. Easter	53	4	6 34	11 12	3 56	4 16
22	M		51	6	7 23	11 57	4 37	4 59
23	Tu	St. George	49	8	8 19	morn.	5 21	5 43
24	W	[Ds. Gloc. b.	47	9	9 21	0 35	6 5	6 28
25	Th	St. Mark. Prs. Alice b.	45	11	10 29	1 7	6 51	7 15
26	F	Mercury sets 9 8 aft.	43	12	11 41	1 33	7 41	8 8
27	S		41	14	0 a 55	1 57	8 38	9 10
28	Sun	3 Sun. aft. Easter	39	16	2 12	2 19	9 45	10 22
29	M		37	18	3 32	2 39	10 58	11 38
30	Tu		35	19	4 56	3 2	— —	0 4

ASTRONOMICAL MEMORANDA.

8th day, Mercury in superior conjunction with the Sun.
11th — Saturn in conjunction with the Moon.
14th — Jupiter in conjunction with the Moon.
18th — Mercury in conjunction with the Moon.
20th — Mars in conjunction with the Moon.
21st — Venus in conjunction with the Moon.
27th — Saturn in quadrature with the Sun.

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MOON'S QUARTERS.

- ☽ Full Moon, 2d day, at 3 h. 16 m. afternoon.
- ☾ Last Quarter, 9th day, at 8 h. 23 m. morning.
- ● New Moon, 17th day, at 8 h. 53 m. morning.
- ☽ First Quarter, 25th day, at 7 h. 30 m. morning.
- ☽ Full Moon, 31st day, at 10 h. 47 m. afternoon.

☉ enters ♊ 21st day, at 0 h. 11 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	56	56	15 N.	12
7	11	56	21	16	55
13	11	56	6	18	29
19	11	56	13	19	51
25	11	56	40	21	1

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			IV	VII								
1	W	St. Phil. and St. James	33	21	6 a	24	3 m	26	0	33	1	0
2	Th		31	22	7	48	3	57	1	26	1	51
3	F	Inven. of the Cross	29	24	9	10	4	34	2	15	2	39
4	S	Saturn rises 1 27 morn.	28	26	10	22	5	23	3	3	3	26
5	Sun	4 Sun. aft. Easter	26	27	11	19	6	23	3	49	4	12
6	M	Jn. Evan. à P. Lat.	24	29	morn.		7	34	4	36	4	59
7	Tu		22	30	0	1	8	51	5	23	5	47
8	W	Easter Term ends	21	32	0	34	10	7	6	11	6	36
9	Th		19	34	1	0	11	21	7	2	7	30
10	F	Jupiter rises 2 44 morn.	17	35	1	21	0 a	32	8	0	8	30
11	S	Mars sets 10 3 aft.	16	37	1	41	1	42	9	0	9	30
12	Sun	5th or Rogation Sun.	14	38	1	59	2	51	10	0	10	28
13	M	Old May Day	12	40	2	18	3	57	10	54	11	20
14	Tu	Venus sets 11 49 aft.	11	41	2	38	5	3	11	45	—	—
15	W		10	43	3	0	6	9	0	8	0	30
16	Th	Ascension. Holy Th.	8	44	3	25	7	13	0	52	1	13
17	F		7	46	3	56	8	13	1	34	1	55
18	S		5	47	4	34	9	7	2	16	2	36
19	Sun	Sun. aft. Asc. Dunstan	4	48	5	19	9	56	2	57	3	17
20	M		3	50	6	13	10	36	3	37	3	57
21	Tu	Mercury sets 8 47 aft.	1	51	7	14	11	9	4	16	4	35
22	W	Trinity Term begins	0	53	8	20	11	37	4	53	5	12
23	Th		III	54	9	30	morn.		5	31	5	51
24	F	Queen Victoria born	58	55	10	40	0	1	6	13	6	35
25	S	Oxford Term ends	57	57	11	53	0	22	6	57	7	22
26	Sun	Whit-Sun. C. T. div. mid.	56	58	1 a	10	0	43	7	51	8	24
27	M	Whit-Mond. Ven. Bede	55	59	2	29	1	5	9	1	9	40
28	Tu	Whit-Tuesday	54	VIII	3	52	1	27	10	21	11	2
29	W	K. Ch. II. Rest. 1660.	53	2	5	17	1	52	11	39	—	—
30	Th	[Ember W. Oxf. T. b.	52	3	6	40	2	26	0	12	0	42
31	F		51	4	7	58	3	8	1	10	1	38

ASTRONOMICAL MEMORANDA.

8th day, Saturn in conjunction with the Moon.
12th — Jupiter in conjunction with the Moon.
14th — Venus at her greatest eastern elongation.
18th — Mercury in conjunction with the Moon.
19th — Mars in conjunction with the Moon.
21st — Venus in conjunction with the Moon.
28th — Mercury in inferior conjunction with the Sun.
31st — Moon totally and visibly eclipsed.

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MOON'S QUARTERS.

☾ Last Quarter, 7th day, at 8 h. 29 m. afternoon.
● New Moon, 16th day, at 0 h. 26 m. morning.
☽ First Quarter, 23d day, at 3 h. 24 m. afternoon.
○ Full Moon, 30th day, at 6 h. 17 m. morning.

☉ enters ♋ 21st day, at 8 h. 46 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	57	32	22 N.	7
7	11	58	32	22	48
13	11	59	43	23	15
19	12	1	0	23	27
25	12	2	18	23	24

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	m	MOON Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			III	VIII								
1	S	Nicomede	50	5	9 a	2	4 m	2	2	4	2	29
2	Sun	Trinity Sunday	49	6	9	52	5	9	2	52	3	14
3	M	Saturn rises 11 26 aft.	48	7	10	30	6	25	3	36	3	58
4	Tu		48	8	11	1	7	44	4	19	4	40
5	W	K. of Han. b. Boniface	47	9	11	25	9	2	5	0	5	20
6	Th	Corpus Christi	47	10	11	45	10	18	5	40	6	1
7	F	Jupiter rises 1 1 morn.	46	11	morn.		11	30	6	24	6	48
8	S		46	12	0	5	0 a	40	7	13	7	39
9	Sun	1 Sun. aft. Trinity	45	13	0	24	1	48	8	7	8	37
10	M		45	13	0	43	2	55	9	8	9	39
11	Tu	St. Barnabas	45	14	1	5	4	0	10	9	10	38
12	W	Trinity Term ends	44	15	1	28	5	5	11	5	11	31
13	Th	Mars sets 9 32 aft.	44	15	1	56	6	6	11	57	—	—
14	F		44	16	2	31	7	3	0	22	0	46
15	S		44	17	3	17	7	53	1	10	1	33
16	Sun	2 Sun. aft. Trinity	44	17	4	8	8	36	1	55	2	16
17	M	St. Alban	44	17	5	6	9	12	2	37	2	57
18	Tu		44	18	6	11	9	41	3	16	3	34
19	W	Venus sets 10 35 aft.	44	18	7	19	10	6	3	52	4	10
20	Th	Queen Victoria acc.	44	18	8	31	10	29	4	28	4	46
21	F	Qu. Vict. proc. L. Day	44	18	9	43	10	49	5	3	5	21
22	S		45	19	10	56	11	9	5	40	6	0
23	Sun	3 Sun. aft. Trinity	45	19	0 a	13	11	31	6	22	6	46
24	M	Nat. J. Bapt. Mids. Day	45	19	1	31	11	54	7	14	7	46
25	Tu	Mercury rises 2 40 morn.	46	19	2	52	morn.		8	24	9	6
26	W		46	19	4	13	0	22	9	51	10	35
27	Th		47	19	5	32	0	59	11	14	11	49
28	F	Queen Victoria Cor.	47	19	6	43	1	46	—	—	0	24
29	S	St. Peter	48	19	7	41	2	46	0	57	1	26
30	Sun	4 Sun. aft. Trinity	48	18	8	24	3	57	1	52	2	17

ASTRONOMICAL MEMORANDA.

4th day, Saturn in conjunction with the Moon.
8th — Jupiter in conjunction with the Moon.
14th — Mercury in conjunction with the Moon.
16th — Venus most bright.
17th — Mars in conjunction with the Moon.
19th — Venus in conjunction with the Moon.
21st — Summer quarter commences.
24th — Jupiter in quadrature with the Sun.

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MOON'S QUARTERS.

☾ Last Quarter, 7th day, at 10 h. 50 m. morning.
● New Moon, 15th day, at 2 h. 23 m. afternoon.
☽ First Quarter, 22d day, at 9 h. 13 m. afternoon.
○ Full Moon, 29th day, at 2 h. 33 m. afternoon.

☉ enters ♌ 22d day, at 7 h. 44 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	3	50	23 N.	6
7	12	4	54	22	34
13	12	5	24	21	48
19	12	5	58	20	48
25	12	6	11	19	36

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	MOON Rises. m	MOON Sets. h	MOON Sets. m	High Water, London Bridge. Morn. h	Morn. m	Aftern. h	Aftern. m
			III VIII									
1	M		49	18	9	a 0	5	m 16	2	40	3	1
2	Tu	Oxf. Act. Camb. Com.	50	18	9	28	6	36	3	21	3	40
3	W	Dog days begin	51	17	9	49	7	56	3	59	4	17
4	Th	Trans. of St. Martin	51	17	10	9	9	11	4	35	4	53
5	F	Cambridge Term ends	52	17	10	29	10	23	5	12	5	31
6	S	Old Mid. D. Ox. T. ends	53	16	10	48	11	33	5	52	6	14
7	Sun	5 S. aft. T. Th. à Becket.	54	16	11	9	0	a 41	6	38	7	2
8	M		55	15	11	33	1	48	7	27	7	54
9	Tu	Saturn rises 9 0 aft.	56	14	12	0	2	54	8	23	8	53
10	W	Jupiter rises 10 54 aft.	57	13	morn.		3	56	9	24	9	54
11	Th	Mars sets 8 44 aft.	58	12	0	32	4	55	10	23	10	53
12	F	Venus sets 8 33 aft.	59	12	1	12	5	48	11	22	11	51
13	S	Mercury rises 3 6 morn.	IV	11	2	0	6	34	—	—	0	18
14	Sun	6 Sun. aft. Trinity	1	10	2	57	7	13	0	44	1	8
15	M	St. Swithin	2	9	4	0	7	44	1	32	1	55
16	Tu		4	8	5	8	8	10	2	17	2	37
17	W		5	7	6	20	8	34	2	56	3	14
18	Th	Saturn rises 8 23 aft.	6	6	7	32	8	55	3	32	3	49
19	F	Jupiter rises 10 20 aft.	8	5	8	46	9	15	4	6	4	23
20	S	Margaret	9	3	10	2	9	37	4	41	5	0
21	Sun	7 Sun. aft. Trinity	10	2	11	20	10	0	5	19	5	40
22	M	Magdalene	11	1	0	a 38	10	25	6	2	6	27
23	Tu	Mars sets 8 18 aft.	13	0	1	57	10	58	6	55	7	28
24	W		14	VII	3	15	11	38	8	6	8	47
25	Th	St. James. Ds. Camb. b.	16	57	4	26	morn.		9	32	10	17
26	F	St. Anne	17	55	5	28	0	31	11	0	11	39
27	S		18	54	6	17	1	36	—	—	0	13
28	Sun	8 Sun. aft. Trinity	20	52	6	56	2	50	0	43	1	11
29	M		21	51	7	27	4	9	1	37	1	59
30	Tu		23	50	7	52	5	28	2	20	2	40
31	W		24	48	8	14	6	47	2	59	3	17

ASTRONOMICAL MEMORANDA.

2d day, Saturn in conj. with ☾; Sun in Apogee.
6th — Jupiter in conj. with ☾
14th — Mercury in conj. with ☾
16th — Mars and Venus in conj. with ☾
19th — Venus in conj. with ♂
21st day, Mercury in superior conj. with ☉
23d — Venus in inferior conj. with ☉
26th — Saturn in opposition to ☉
29th — Saturn in conjunction with ☾

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MOON'S QUARTERS.

☾ Last Quarter, 6th day, at 3 h. 26 m. morning.
● New Moon, 14th day, at 2 h. 32 m. morning.
☽ First Quarter, 21st day, at 2 h. 16 m. morning.
○ Full Moon, 28th day, at 0 h. 34 m. morning.

☉ enters ♍ 23d day, at 2 h. 17 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	12	6	0	17 N.	57
7	12	5	27	16	21
13	12	4	33	14	35
19	12	3	20	12	41
25	12	1	50	10	39

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			IV	VII								
1	Th	Lammas Day	26	46	8 a	33	8 m	2	3	34	3	51
2	F	Saturn sets 3 57 morn.	27	45	8	54	9	14	4	8	4	26
3	S		29	43	9	14	10	24	4	45	5	4
4	Sun	9 Sun. aft. Trinity	30	41	9	36	11	33	5	23	5	43
5	M	[Dog days end	32	40	10	1	0 a	39	6	5	6	29
6	Tu	Transfiguration	33	38	10	31	1	43	6	54	7	20
7	W	Name of Jesus	35	36	11	9	2	44	7	48	8	17
8	Th	Jupiter rises 9 1 aft.	36	34	11	55	3	40	8	47	9	16
9	F		38	32	morn.		4	29	9	46	10	16
10	S	St. Lawrence	40	31	0	47	5	10	10	47	11	18
11	Sun	10 Sun. aft. Trinity	41	29	1	47	5	45	11	48	—	—
12	M	[Dog days end	43	27	2	54	6	14	0	16	0	42
13	Tu	Queen Dowager born	44	25	4	6	6	38	1	7	1	30
14	W		46	23	5	19	7	1	1	53	2	14
15	Th	Assumption B. V. M.	48	21	6	34	7	23	2	34	2	52
16	F	Mars rises 4 22 morn.	49	19	7	50	7	43	3	10	3	27
17	S	Duchess of Kent b.	51	17	9	7	8	6	3	45	4	3
18	Sun	11 Sun. aft. Trinity	52	15	10	26	8	32	4	23	4	44
19	M		54	13	11	45	9	1	5	5	5	28
20	Tu		55	11	1 a	3	9	39	5	52	6	19
21	W	Venus rises 2 15 morn.	57	9	2	15	10	26	6	49	7	22
22	Th	Mercury sets 7 46 aft.	59	7	3	20	11	25	8	0	8	41
23	F		v	5	4	11	morn.		9	22	10	8
24	S	St. Bartholomew	2	2	4	53	0	34	10	44	11	22
25	Sun	12 Sun. aft. Trinity	3	0	5	26	1	50	11	54	—	—
26	M	Prince Albert born	5	VI	5	54	3	7	0	23	0	49
27	Tu		7	56	6	17	4	25	1	12	1	34
28	W	St. Augustine	8	54	6	37	5	41	1	54	2	13
29	Th	St. John Baptist beh.	10	52	6	57	6	55	2	31	2	49
30	F		11	50	7	18	8	5	3	7	3	24
31	S		13	47	7	40	9	15	3	40	3	57

ASTRONOMICAL MEMORANDA.

2d day, Jupiter in conjunction with the Moon.
4th — Mars in conjunction with the Sun.
11th — Venus in conjunction with the Moon.
13th — Mars in conjunction with the Moon.
15th — Mercury in conjunction with the Moon.
25th — Saturn in conjunction with the Moon.
28th — Venus most bright.
30th — Jupiter in conjunction with the Moon.

[PRINTED FOR THE COMPANY OF STATIONERS.]

MOON'S QUARTERS.

☾ Last Quarter, 4th day, at 9 h. 43 m. afternoon.
● New Moon, 12th day, at 1 h. 16 m. afternoon.
☽ First Quarter, 19th day, at 7 h. 52 m. morning.
○ Full Moon, 26th day, at 1 h. 13 m. afternoon.

☉ enters ♎ 22d day, at 10 h. 57 m. afternoon.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	59	45	8 N.	10
7	11	57	48	5	57
13	11	55	44	3	40
19	11	53	38	1 N.	21
25	11	51	33	1 S.	0

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	SUN Sets	MOON Rises. h	MOON Rises. m	MOON Sets. h	MOON Sets. m	High Water, London Bridge. Morn. h	Morn. m	Aftern. h	Aftern. m
			V	VI								
1	Sun	13 Sun. aft. Trin. Giles	15	45	8 a	4	10m	24	4	15	4	34
2	M	London burnt, 1666, O. S.	16	43	8	33	11	30	4	55	5	17
3	Tu		18	41	9	8	0 a	31	5	40	6	3
4	W	Saturn sets 1 36 morn.	19	38	9	50	1	29	6	27	6	52
5	Th	Old Bartholomew	21	36	10	39	2	20	7	19	7	46
6	F		23	34	11	36	3	4	8	14	8	43
7	S	Enurchus	24	32	morn.		3	41	9	12	9	42
8	Sun	14 Sun. after Trinity.	26	29	0	39	4	13	10	12	10	43
9	M	[Nat. V. B. M.	27	27	1	47	4	39	11	13	11	43
10	Tu	Jupiter rises 6 46 aft.	29	25	2	59	5	3	—	—	0	12
11	W	Mars rises 4 16 morn	31	22	4	14	5	26	0	38	1	2
12	Th	Venus rises 1 38 morn.	32	20	5	29	5	48	1	25	1	47
13	F	Mercury sets 6 33 aft.	34	18	6	47	6	10	2	8	2	29
14	S	Holy Cross	35	16	8	7	6	34	2	49	3	8
15	Sun	15 Sun. aft. Trinity	37	13	9	30	7	4	3	28	3	49
16	M		39	11	10	49	7	41	4	10	4	32
17	Tu	Lambert	40	9	0 a	5	8	25	4	56	5	22
18	W	Emb. W. Geo. I. and II.	42	6	1	13	9	21	5	49	6	17
19	Th	[landed	43	4	2	9	10	27	6	47	7	19
20	F	Saturn sets 0 29 morn.	45	2	2	53	11	40	7	54	8	30
21	S	St. Matthew	47	v	3	28	morn.		9	6	9	42
22	Sun	16 Sun. aft. Trinity	48	57	3	56	0	54	10	17	10	51
23	M		50	55	4	21	2	10	11	23	11	52
24	Tu	Jupiter rises 5 47 aft.	51	52	4	41	3	25	—	—	0	17
25	W	Mars rises 4 12 morn.	53	50	5	2	4	38	0	40	1	2
26	Th	St. Cyprian	55	48	5	23	5	49	1	22	1	42
27	F	Venus rises 1 42 morn.	56	46	5	44	6	58	2	1	2	19
28	S	[Michaelmas Day	58	43	6	7	8	6	2	37	2	54
29	Sun	17 Sun. aft. Trinity.	VI	41	6	34	9	14	3	12	3	30
30	M	S. Jerome	1	39	7	6	10	18	3	48	4	8

ASTRONOMICAL MEMORANDA.

9th day, Venus in conjunction with the Moon.
11th — Mars in conjunction with the Moon.
14th — Mercury in conjunction with the Moon.
21st — Jupiter in opposition to the Sun; Saturn in conjunction with the Moon.
22d — Autumn quarter commences.
26th — Jupiter in conjunction with the Moon.
28th — Mercury in inferior conjunction with the Sun.

[PRINTED FOR THE COMPANY OF STATIONERS.]

MOON'S QUARTERS.

☾ Last Quarter, 4th day, at 4 h. 29 m. afternoon.
● New Moon, 11th day, at 11h. 24 m. afternoon.
☽ First Quarter, 18th day, at 3 h. 16 m. afternoon.
○ Full Moon, 26th day, at 5h. 5 m. morning.

☉ enters ♏ 23d day, at 7 h. 10 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	49	34	3 S.	20
7	11	47	46	5	39
13	11	46	14	7	55
19	11	45	1	10	8
25	11	44	10	12	15

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	V								
1	Tu	Remigius	3	36	7 a	46	11 m	8	4	28	4	49
2	W		5	34	8	31	0 a	11	5	11	5	34
3	Th	Saturn sets 11 33 aft.	6	32	9	25	0	57	5	58	6	22
4	F	Jupiter sets 4 54 morn.	8	29	10	23	1	37	6	46	7	10
5	S		9	27	11	28	2	10	7	35	8	2
6	Sun	18 Sun. aft. Tr. Faith	11	25	morn.		2	38	8	31	9	0
7	M		13	23	0	39	3	4	9	30	10	0
8	Tu	Mars rises 4 8 morn.	15	21	1	50	3	26	10	31	11	4
9	W	St. Denys	16	18	3	4	3	48	11	36	—	—
10	Th	Oxf. & Camb. Terms beg.	18	16	4	21	4	11	0	5	0	33
11	F	Old Michaelmas Day	20	14	5	42	4	36	0	59	1	23
12	S	Least Twilight	21	12	7	5	5	4	1	46	2	8
13	Sun	19 S. aft. Tr. Tr. K. Ed.	23	10	8	27	5	39	2	31	2	53
14	M	[Conf.	25	7	9	47	6	20	3	15	3	38
15	Tu	Venus rises 2 7 morn.	26	5	11	1	7	13	4	1	4	25
16	W		28	3	0 a	2	8	18	4	50	5	15
17	Th	Etheldreda	30	1	0	50	9	31	5	41	6	8
18	F	St. Luke	32	IV	1	29	10	45	6	36	7	4
19	S	Mercury rises 4 51 morn.	33	57	1	59	12	0	7	33	8	4
20	Sun	20 Sun. aft. Trinity	35	55	2	25	morn.		8	37	9	11
21	M		37	53	2	46	1	14	9	44	10	16
22	Tu	Saturn sets 10 20 aft.	39	51	3	7	2	27	10	45	11	13
23	W	Jupiter sets 3 27 morn.	40	49	3	27	3	37	11	39	—	—
24	Th		42	47	3	48	4	46	0	4	0	26
25	F	Crispin	44	45	4	11	5	55	0	47	1	8
26	S	Mars rises 4 2 morn.	46	43	4	36	7	2	1	28	1	48
27	Sun	21 Sun. aft. Trinity	47	41	5	7	8	7	2	7	2	27
28	M	St. Simon and St. Jude	49	39	5	43	9	8	2	47	3	7
29	Tu	Venus rises 2 36 morn.	51	37	6	27	10	3	3	27	3	47
30	W		53	35	7	17	10	52	4	7	4	27
31	Th		54	33	8	13	11	34	4	47	5	8

ASTRONOMICAL MEMORANDA.

5d day, Venus at her greatest western elongation.
8th — Venus in conjunction with the Moon.
10th — Mars and Mercury in conjunction with the Moon.
19th — Saturn in conjunction with the Moon.
23d — Jupiter in conjunction with the Moon.
24th — Saturn in quadrature with the Sun.

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MOON'S QUARTERS.

☾ Last Quarter, 3d day, at 10 h. 19 m. morning.
● New Moon, 10th day, at 9 h. 36 m. morning.
☽ First Quarter, 17th day, at 1 h. 31 m. morning.
○ Full Moon, 24th day, at 11 h. 42 m. afternoon.

☉ enters ♐ 22d day, at 3 h. 45 m. morning.

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	43	43	14 S.	34
7	11	43	51	16	25
13	11	44	31	18	5
19	11	45	40	19	35
25	11	47	18	20	51

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VI	IV								
1	F	All Saints	56	31	9 a	15	0 a	10	5	29	5	50
2	S	All Souls. Mich. T. beg.	58	30	10	21	0	39	6	12	6	34
3	Sun	22 S. aft. T. Prs. Soph. b.	VII	28	11	31	1	5	6	57	7	20
4	M	K. William III. landed	1	26	morn.		1	28	7	45	8	12
5	Tu	Gunpowder Plot 1605	3	24	0	42	1	49	8	42	9	14
6	W	Leonard	5	22	1	56	2	10	9	48	10	24
7	Th	Saturn sets 9 21 aft.	7	21	3	12	2	34	10	59	11	33
8	F	Jupiter sets 2 18 morn.	9	19	4	33	2	59	—	—	0	5
9	S	Pr. Wales b. 1841 L. M.	11	17	5	56	3	31	0	33	1	0
10	Sun	23 Sun. aft. T. [Day	12	16	7	18	4	11	1	26	1	52
11	M	St. Martin	14	15	8	38	5	0	2	17	2	42
12	Tu	Cam. Term div. mid.	16	13	9	47	6	2	3	6	3	30
13	W	Britius	17	12	10	44	7	15	3	53	4	16
14	Th	Mars rises 3 57 morn.	19	10	11	27	8	31	4	39	5	2
15	F	Machutus	21	9	0 a	1	9	48	5	25	5	48
16	S	Venus rises 3 20 morn.	23	7	0	29	11	4	6	12	6	37
17	Sun	24 S. aft. T. Hugh Bp.	24	6	0	52	morn.		7	3	7	31
18	M	[Lin.	26	5	1	13	0	18	8	1	8	31
19	Tu	Mercury rises 7 43 morn.	28	4	1	33	1	29	9	2	9	32
20	W	Ed. King and Martyr	29	2	1	54	2	37	10	0	10	28
21	Th	Princess Royal born	31	1	2	15	3	45	10	55	11	22
22	F	St. Cecilia	33	0	2	39	4	52	11	47	—	—
23	S	St. Clement	34	III	3	8	5	58	0	12	0	36
24	Sun	25 Sun. aft. Trinity	36	58	3	42	7	1	0	59	1	21
25	M	Mich. T. ends. Catherine	38	57	4	24	7	57	1	43	2	4
26	Tu		39	56	5	12	8	49	2	24	2	44
27	W	Saturn sets 8 9 aft.	41	55	6	6	9	33	3	4	3	23
28	Th	Jupiter sets 0 59 morn.	42	55	7	6	10	10	3	42	4	1
29	F		44	54	8	10	10	41	4	20	4	39
30	S	St. Andrew	45	53	9	18	11	7	4	59	5	18

ASTRONOMICAL MEMORANDA.

7th day, Venus in conjunction with the Moon.
8th — Mars in conjunction with the Moon.
10th — Mercury in conjunction with the Moon.
15th — Saturn in conjunction with the Moon; Mercury in superior conjunction with the Sun.
19th — Jupiter in conjunction with the Moon.
24th — Moon totally and visibly eclipsed.
26th — Venus in conjunction with Mars.

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MOON'S QUARTERS.

☾ Last Quarter, 3d day, at 2 h. 8 m. morning.
● New Moon, 9th day, at 8 h. 13 m. afternoon.
☽ First Quarter, 16th day, at 3 h. 22 m. afternoon.
○ Full Moon, 24th day, at 7 h. 29 m. afternoon.

☉ enters ♑ 21st day, at 4 h. 31 m. afternoon

Day.	Time on clock at Sun's noon. h	m	s	Sun's Dec. °	′
1	11	49	23	21 S.	53
7	11	51	51	22	40
13	11	54	37	23	12
19	11	57	33	23	26
25	12	0	33	23	24

M D	W D	Sundays, Anniversaries, &c.	SUN Ris.	Sets	MOON Rises. h	m	Sets. h	m	High Water, London Bridge. Morn. h	m	Aftern. h	m
			VII	III								
1	Sun	Advent Sunday	46	52	10 a	27	11 m	31	5	38	5	58
2	M		48	52	11	37	11	52	6	18	6	39
3	Tu	Saturn sets 7 49 aft.	49	51	morn.		0 a	13	7	1	7	25
4	W	Jupiter sets 0 38 morn.	51	51	0	49	0	35	7	52	8	24
5	Th		52	50	2	5	0	58	9	0	9	40
6	F	Nicholas	53	50	3	26	1	26	10	20	10	58
7	S	[tion B. V. M.	54	50	4	46	1	59	11	35	—	—
8	Sun	2 Sun. in Adv. Concep-	55	49	6	6	2	43	0	9	0	40
9	M		56	49	7	23	3	39	1	10	1	38
10	Tu	Mars rises 3 48 morn.	58	49	8	27	4	47	2	5	2	31
11	W		59	49	9	18	6	4	2	54	3	16
12	Th		VIII	49	9	58	7	25	3	38	4	0
13	F	Lucy	0	49	10	29	8	44	4	21	4	42
14	S	Venus rises 4 37 morn.	1	49	10	55	10	2	5	2	5	23
15	Sun	3 Sun. in Advent	2	49	11	18	11	16	5	45	6	7
16	M	Cam. T. ends. O! Sap.	3	49	11	38	morn.		6	30	6	55
17	Tu	Oxford Term ends	4	49	0 a	0	0	27	7	21	7	49
18	W	Ember Week	5	50	0	22	1	35	8	19	8	49
19	Th	Mercury sets 5 0 aft.	5	50	0	45	2	43	9	18	9	47
20	F		6	50	1	11	3	50	10	15	10	43
21	S	St. Thomas. Shortest Day	6	51	1	43	4	58	11	11	11	38
22	Sun	4 Sun. in Advent	7	51	2	22	5	51	—	—	0	4
23	M	Saturn sets 6 41 aft.	7	52	3	8	6	45	0	29	0	53
24	Tu	Jupiter sets 11 25 aft.	8	52	4	0	7	32	1	16	1	39
25	W	Christmas Day	8	53	4	59	8	12	2	1	2	22
26	Th	St. Stephen	8	54	6	2	8	45	2	43	3	3
27	F	St. John Evan.	8	55	7	9	9	12	3	22	3	40
28	S	Innocents	9	55	8	17	9	36	3	57	4	14
29	Sun	1 Sun. aft. Christmas	9	56	9	26	9	58	4	31	4	49
30	M		9	57	10	37	10	19	5	7	5	26
31	Tu	Silvester	9	58	11	49	10	40	5	45	6	6

ASTRONOMICAL MEMORANDA.

6th day, Mars in conjunction with the Moon.
7th — Venus in conjunction with the Moon.
10th — Mercury in conjunction with the Moon.
12th — Saturn in conjunction with the Moon.
16th — Jupiter in conjunction with the Moon.
17th — Jupiter in quadrature with the Sun.
21st — Winter quarter commences.
30th — Sun in perigee.

[Printed for the company of stationers.]

LIST OF PATENTS FOR NEW INVENTIONS,

GRANTED FOR ENGLAND, SCOTLAND, AND IRELAND,

[*For England between Sept.* 29. 1842, *and Sept.* 28. 1843; *for Scotland from August* 23. 1842, *to Sept.* 20. 1843; *for Ireland from Sept.* 5. 1842, *to July* 12. 1843.]

Subject.	Name.	England.	Scotland.	Ireland.
Aerated liquids	Purt, Geo., and Hale, William	Dec. 8.		
Do.	Maughan, William	Jan. 31.		
Do.	Hicks, Robert	Feb. 11.		
Do.	Mayo, William, and Warmington, John	April 25.	May 4.	
Aerial locomotion	Moat, William Crofton	July 26.		
Do.	Henson, Samuel	Sept. 29.		
Agricultural implements	Parsons, George, and Clyburn, Richard	July 7.	July 18.	
Do.	Newton, William Edw.	July 13.		
Do.	Messrs. Ransome, May, Biddel, and Worby	July 13.		
Air, supplying in a pure and respirable state	Payerne, Prosper A.	June 15.		
Do.	Vigors, William Revell			Oct. 14.
Alarums	Smith, Henry	July 13.		
Alkali	Longmaid, William	Oct. 20.	Mar. 13.	
Alum	Turner, G. W.	Oct. 8.	Jan. 12.	May 4.
Do.	Kagenbusch, Peter	Oct. 13.	Sept. 29. April 6.	
Ammonia, purification and application of	Laming, Richard	July 13.	July 19.	
Anchors	Browne, Sir Samuel	Mar. 26.		
Asphalte	Bell, Edward	Sept. 29.	Mar. 2.	May 7.
Axles and Axletrees	Newton, William Edw.	Dec. 8.	April 26.	
Do.	Do.	May 15.	April 26.	
Do.	York, Jn. O.	Oct. 8.		
Do.	Wolferstan, Thomas	Mar. 18.		
Do.	Walker, William	Mar. 2.		
Do., prevention of accidents from breaking of	Boydell, James, jun.	Feb. 17.		
Bands and straps	Hancock, William	Dec. 3.		
Bathing apparatus	Johnson, Edward	June 27.		
Beds	Tavernier, J. M.	Dec. 22.	Feb. 13.	
Do.	Farmer, Richard, and Pitt, Joseph	June 6.		
Bedsteads	Do.	June 6.		
Do.	Badger, Jonathan	Feb. 11.		
Do. (and couches)	Thompson, J.	May 16.		
Do. (securing)	Sculthorpe, G. K.	July 13.		
Bits for horses	Lord Thurlow	Dec. 29.		
Blacking	Roberts, M. J.	March 16.		
Bleaching	Wright, L. W.	June 15.	Sept. 20.	
Blinds for carriages	Statham, James	April 20.		
Do. Window and curtain	Weild, William	Jan. 28.		
Do. Do.	Newberry, G. J.	July 26.		
Blowing machines	Lejeune, Jules		March 7.	
Boilers	Squire, J.	Dec. 21.		
Do.	Zander, Hinrik	Nov. 8.	May 2.	
Do.	Parsons, P. M.	Dec. 8.		
Do.	Winchester, James	Dec. 15.		
Do.	Moreau, G. H.	Dec. 21.		

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Subject.	Name.	England.	Scotland.	Ireland.
Boilers	Hills, Frank	Mar. 30.		
Do.	Tayleur, Dupré, and Dubs	April 19.		
Do.	Johnston, James	April 20.		
Do.	Waller, Richard	June 27.		
Do.	Tetley, Charles	June 30.		
Do.	Napier, David	July 23.		
Do.	Borrie and Henry	Aug. 3.		
Do.	Bennetts, George	Aug. 15.		
Do. (feeding)	Shaw, W. R.	Jan. 21.		
Bonnets and hats	Oldham, Thomas	June 15.	July 24.	
Boots and shoes	Barber, Richard	Dec. 8.		
Do.	Kempson, William	Dec. 8.		
Do.	Masons, Samuel, and Bedells, Charles	June 15.		
Do.	Verity, James	July 3		
Do.	Wright, John and Richard	July 6.		
Do	Baker, William		Dec. 7.	
Do. (mud)	Browne, John			Oct. 8.
Borax	Sautter, C. M. E.	May 22.	May 23.	
Bottles, filling and covering	Mayo, William, and Warmington, John		May 4.	July 12.
Do., covering and stopping necks of	Betts, Jn. Thos.	Mar. 16. June 27.	Sept. 8. Jan. 23. March 7.	Dec. 24. May 7.
Do., securing corks in	Fletcher, William	Aug. 24.		
Bowls and Rolls	Hesford, James	May 2.		
Bread	Alzard, Gilb. C.	Oct. 20.		
Breakwaters	Tayler, J. N., and Smith, W. H.	Mar. 21.		
Do.	Browne, Sir Samuel	Mar. 27.		
Bricks and tiles	Etheridge, F. W.	Dec. 3.		
Do.	Smith, Charles	Nov. 17.		
Do.	Kirby, Jos.	Jan. 26.		
Do.	Betts, William, and Tayler, William	Mar. 8.		
Do.	Forsyth, Thomas	June 1.		
Do., cutting or boring	Gillet, John	May 25.		
Brine, evaporation of	Kneller. W. G.	Dec. 22.		
Bristles	Rigby, E. R. and C.	Dec. 20.		
Bronze powders	Bessemer, Henry	June 15.		
Brushes (water colour)	Cobbold, Edward	Dec. 3.		
Do.	Bayley, G. P.	Jan. 26.		
Do.	Hancock, William			Sept. 5.
Buckles	Simpson, Thomas	March 2.		
Building	Laycock, William	March 16.		
Do.	Drake, J. G.	Aug. 22.		
Buoys and water marks	Pim, William	March 18.		
Buttons	Bridges, William	Dec. 22.		
Do. (metal)	Rowley, Charles, and Turner, James	Nov. 15.		
Do. (covered)	Aston, John, and Elhot, William	April 4.		
Calculating machine	Wertheimer, D. J.	Jan. 28.		
Candles	Smith, William	Sept. 29.		
Do.	Jones, William Coley	Nov. 8.	Dec. 7.	Dec. 29.
Do.	Do., and Ferguson, W. G.	Dec. 8.	Dec. 7.	Dec. 30.
Do.	Palmer, William	Dec. 15. Jan. 26.	Dec. 22.	
Do.	Morgan, Josiah	Feb. 11.		
Do.	Doudney, G. E. and E. P.	Feb. 17.		

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Candles	Whele, Edwin	April 6.		
Do.	Tindal, William	April 11.		
Do.	Kempton, W. H.		Sept. 2.	Oct. 6.
Candlesticks	Ward, F. O., and Freeman, M.	Nov. 25.		
Do.	Young, William		Dec. 12.	Feb. 28.
Candlewicks	Ward, Nathaniel	Jan. 14.		
Do.	Whele, Edwin	April 6.		
Capstans	Young, G. J.	April 5.		
Card Cases	Freeman, Mark	Aug. 22.		
Carding engines and machines	Brown, Henry, and Walker, Thomas	Oct. 13.	Oct. 20.	
Do.	Smith, J. B.	June 8.	Aug. 21.	
Do.	Sparks, Samuel	June 10.		
Do.	Lister, George, and Budding, Edward	June 15.		
Do.	Faulkner, Samuel	July 25.		
Cards, grinding and sharpening	Kennedy, R. A.	May 15.	June 17.	
Carriages	Wilkey, J. F.	Sept. 29.		
Do.	Spinks, John, jun.	Nov. 8.	Nov. 21.	Dec. 5.
			March 30.	
Do.	Pandia, Theodore R.	Nov. 25.		
Do.	Violette, F. C. M.	April 22.		
Do.	Kettle, J. L. R., and Prosser, William	May 16.		
Do.	Harvey, Joseph	July 20.		
Do.	Johnston, Alexander		Jan. 20.	Oct. 6.
Do.	James, W. H.		March 27.	
Casks, &c.	Brown, Samuel	June 17.		
Cement	Deutsche, Edward C.	Oct. 8.	Oct. 18.	Nov. 7.
			Aug. 13.	
Do.	Smith, Charles	Nov. 17.		
Do.	Fontainemoreau,	Jan. 14.		
Do.	Austin, Henry	June 10.		
Do.	Bertram, Charles	July 20.		
Do.	Jeffrey, Alfred		Oct. 18.	
Chandeliers'	Barclay, Andrew	March 24.	Mar. 24.	
Chain cables, &c., working	Brown, James	Aug. 16.		
Chalybeate	Bewley, Henry		Oct. 4.	
Chimneys	Moon, James	April 25.		
Do.	Tappan, John	May 30.		
Do., prevention of fire in	Varroc, Eugene de		Sept. 1.	Oct. 14.
China and porcelain	Brown, William	June 3.	May 26.	
Chlorine and chlorides	Walters, G. S.	Mar. 24.	March 23.	
			Aug. 16.	
Do.	Seybell, Julius			Oct 15.
Clogs	Barber, Richard	Dec. 8.		
Do.	Mason, Samuel, and Bedells, C.	June 15.		
Cloths	Clark, James	Feb. 1.	Feb. 2.	Feb. 1.
Do., lapping and folding	Clark, Henry	Feb. 26.	Nov. 17.	Sept. 13.
Do., dressing	Mitchell, Thomas	June 15		
Do.	Bridson, T. R.			Jan. 21.
Coating metals	Talbot, W. H. F.	Nov. 25.		
Do.	Blackwell, B. B., and Norris, William	Feb. 21.		
Do.	Morewood, Edw., and G. Rogers	May 4.	Aug. 8.	
Do.	Bertram, Charles	July 20.		
Cocoa nut fibres	Logan, Robert		Jan. 9.	
Coffee	Poole, Moses	April 29.		
Coffins	Leathes, J. H., and Kirrage, William	Feb. 25.		
Colour holders, collapsing	Rand, John	Sept. 29.	Dec. 29.	Feb. 28.

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Colouring matter	Stainer. Frederick	Aug. 8.	Sept. 7.	
Combs and brushes	Hancock, William			Sept. 5.
Combustion	Rothwell, John,	Nov. 5.		
Do.	Kymer, Jn., and Leighton, T. H.	Feb. 21.		
Do.	Tappan, John	May 30.		
Do.	Booth, G. R.	June 15.		
Do.	Hall, Samuel		Jan. 18.	
Do.	Lejeune, Jules		March 7.	
Conveyance	Potts, Dr.	Feb. 21.		
Copper	Bell, Thomas			Oct. 15.
Cork cutting	Geeves, William			Oct. 6.
Cotton reels	Harris, W. S., and Hamel, S.	Dec. 8.		
Cutlery, &c., grinding	Tappan, John	June 10.		
Do.	Lister, Geo., and Budding, Edw.	June 15.		
Cutting hay, &c.	Gardner, James	Oct. 27. June 17.	Jan. 11.	
Do.	Phillips, Charles	July 3.		
Do., leather	Mansell, Thomas	Dec. 3.		
Doors, fastenings for	Smith, Henry	July 13.		
Drags or breaks	Thatcher, Charles and Thomas		Feb. 22.	
Drawings, fabric for mounting	Chapman, Henry	Jan. 26.		
Drying cotton, &c.	Keely, Jn., and Alliott, Alex.	Mar. 2.		
Drying and dressing corn, &c.	Bell, George	March 1.	March 2.	
Do.	Poole, Alfred	May 25.		
Do.	Cockson, T. C., and Ball, George			Sept. 5.
Dyeing wool, &c.	Roberts, M. J.	Jan. 26.		
Do.	Hancock, Charles	Jan. 31.		
Earthenware	Brown, William	June 6.		
Edge tools, metals for	Boydell, James, jun.	Jan. 26.	Feb. 1.	
Electrical apparatus	Hull, Alonzo G.	Dec. 28.	July 15.	
Do.	Bain, Alexander	May 27.		
Excavating	Newton, William			Sept. 15.
Fabrics, lace and stocking	Stubbings, John	Dec. 3.		
Do.	Nicholls, Christopher	Feb. 11. May 22.		
Do., framework knitted	Bailey, Benjamin	Dec. 29.		
Do. do,	Clarke, Uriah	Jan. 21.		
Do. do.	Wickes, J. B.	Sept. 21.		
Do., lapping and folding	Clarke, Henry	Feb. 26.	Nov. 17.	Sept. 13.
Do., elastic and non-elastic	Clarke, Uriah	April 11.		
Do., glossing and facing	Mitchell, Thomas	June 15.		
Do., stretching, dyeing, and finishing	Bridson, T. R.			Jan. 21.
Fasteningsfor boxes,books,&c.	Thomas, William	Sept. 6.		
Filtration	Maurras, A. E. G. A.	Nov. 15.	May 17.	
Do.	Stuckey, W. H.	Dec. 23.		
Do., farina	Snell, William	Jan. 14.		
Fire arms, wadding for	Brockedon, William	April 25.		
Do.	Needham, William	June 24.	July 4.	
Fire, extinguishing	Timmins, Edward	Dec. 3.		
Flax and hemp	Marsden, Thos., and Robinson, S.		Sept. 1.	Oct. 14
Floors	Loat, W. J.	Jan. 12.		

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Subject.	Name.	England.	Scotland.	Ireland.
Flooring, fireproof	Heard, C. W.	Nov. 25.		
Flour, manufacture of	Cotterill, C. F.	April 27.		
Flour mill	Corcoran, Bryan	Aug. 25.		
Flues	Moon, James	April 25.		
Do., and fire-places	Denley, William	Sept. 21.		
Do., of steam boilers	Cutler, Job		Aug. 23.	
Fluids, evaporation of	Perkins, A. M.		May 23.	
Food, preparation of	Neville, A. H.	Mar. 24.		
Framework knitting	Wickes, J. B.			Jan. 21.
Fringes, &c.	Lomas, William, and Shimwell, Isaac	Dec. 8.	Dec. 21.	
Fuel, artificial	Bell, Edward	Sept. 29.	March 2.	May 7.
Do.	Newton, W. E.	Oct. 13.		
Do.	Holcombe, C. T.	Oct. 13.		
Do.	Cooke, Masta J.	March 2.		
Do.	Oram, T., and Warlich, F. C.	April 20.		
Do.	Dobree, C. P.	June 10.		
Do.	Wylam, William	June 22.	Aug. 28.	
Funnels	M'Innes, John	April 20.		
Furnaces	Zander, Hinrik	Nov. 8.	May 2.	
Do.	Thorneycroft, G. B.	Jan. 31.	Feb. 1.	
Do.	Delcroix, F., jun	July 6.		
Do.	Baron Von Rathen			July 12.
Do.	Juckes, John		Mar. 20.	
Do. (Zink)	Vivian, H.H., and Gossage, William	Jan. 14.		
Gas	Croll, A. A., and Richards, William	March 16.		
Do., purifying	Phillips, Henry	Jan. 26.		
Do. do.	Brooks, Charles	Feb. 17.		
Gas burners	Faraday, Robert	Mar. 25.	April 19.	July 10.
Gas meters	Croll, A. A., and Richards, W.	Mar. 16.		
Do.	Farwig, C. L.	April 19.		
Do.	Edge, Thomas		March 30.	
Gas retorts	Malam, James	Mar. 16.		
Generators, Steam	Moreau, G. H.	Dec. 21.	Dec. 13.	Jan. 11.
Do.	Squire, John	Dec. 21.		
Do.	Hills, Frank	Mar. 30.		
Do.	Tetley, Charles	June 30.		
Do.	Napier, David	July 23.		
Do.	Bennetts, George	Aug. 15.		
Gilding and plating	Barrett, O. W.	June 15.		
Glass	Hartley, James	July 3.		
Do., cutting, grinding, and polishing	Barclay, Henry		Aug. 25.	
Glass bottles	Spears, Alexander	Sept. 6.	Sept. 7.	
Gloves	Walter, J. W.	May 16.		
Do., leather	Ensor, Thomas	Feb. 11.		
Do., fastenings for	Mills, William	May 16.		
Grinding and dressing corn	Hebert, Luke	Jan. 19.	July 13.	
Harrows	Grant, Jos. C.	July 6.		
Hats	Oldham, Thomas	June 15.	July 24.	
Hay making machinery	Wedlake, Thomas	July 3.		
Heating	Bevan, Richard	Nov. 5.		
Do.	Sylvester, John	Mar. 28.		
Do.	Booth, G. R.	June 15.	June 15.	
Hemp and flax	Marsden, Thomas, and Robinson, J.	Sept. 1.	Sept. 13.	
Hinges	Matchett, F. C.	May 6.		
Horse shoes	Turnbull, John	May 6.		
Do.	Neville, James	July 6.		

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Subject.	Name.	England.	Scotland.	Ireland.
Horse shoes	Horne, James	Aug. 8.		
Hosiery	Kempson, William	Dec. 8.		
Do.	Keene, Charles	Dec. 15.		
Do.	Bates, William	Jan. 19.	Aug. 14.	
Do.	Smith, W. H.	April 19.		
Hydrostatic engine	Lipscombe, Frederick	Aug. 17.		
Ice preserving	Masters, Thomas	July 6.		
Ink	Roberts, M. J.	Mar. 16.		
Iron	Budd, J. P.	Oct. 20.		
Do.	Thorneycroft, G. B.	Jan. 31.	Feb. 1.	
Do.	Perkins, A. M.	Mar. 16.		
Do., malleable	Beaman, Jos.	Dec. 22.	Jan. 18. June 7.	April 4.
Do., ornamenting	Sylvester, John	Mar. 28.		
Do., bars of	Boydell, James	April 7.	June 7.	
Do., rolling sheet	Daniell, William	July 22.		
Kilns, malt, &c. drying	Knight, S. J.	June 10.		
Knitting	Tielens, Jn. A.			Oct. 14.
Lace, ornamental	Heathcoate, John, and Brewin, A.	Feb. 28.		
Do.	Poole, Moses	April 11.		
Lamps	Newton, W. E.	June 10.		
Do.	Kurtz, Charles	June 30.		
Do.	Young, William		Dec. 12.	Feb. 28.
Lapping and folding cloth	Clarke, Henry	Feb. 23.	May 17.	Sept. 13.
Leather	Nisbett, John		May 23.	
Letters, checking and delivering	Harcourt, G. R. D.	Sept. 28.		
Life, preservation of, at sea	Irvine, T. J.	June 15.		
Light	Pelletan, Pierre	Nov. 2. Sept. 6.	May 4.	
Do.	Baggs, Isham	Nov. 25.	Sept. 8. Dec. 13. May 9.	Dec. 29.
Do.	Winsor, F. A.	Jan. 26.		
Do.	Phillips, Henry	Jan. 26.		
Do.	Boccius, Gottlieb	Feb. 28.		
Do.	Allman, Fennell	June 13.	Aug. 14.	
Do.	Newton, W. E.	June 10.		
Do.	Gurney, G.			Mar. 24.
Do.	Wilson, Brownrigg, Cockerill, and Carpent	Aug. 24.	Aug. 31.	
Lighthouses	Browne, Sir Samuel	Mar. 27.		
Lime	Daniell, Francis, and Hutchinson, T.	May 4.		
Liquids, impregnating, with air and gases	Purt, Geo., and Hale, William	Dec. 8.		
Do.	Maughan, William	Jan. 31.		
Do.	Hicks, Robert	Feb. 11.		
Do.	Mayo, William, and Warmington, John	April 25.	May 4.	
Linen, rubbing	Laing, John		May 23.	
Locks	Rock, Jos., jun.	Dec. 29.		
Locomotion	Johnston, Alexander		Jan. 20.	Oct. 6.
Locomotive carriages	Hills, Frank	March 30.		
Do., engines	Wilson, Robert	Dec. 22.	Dec. 27.	
Do.	Morris, James	Dec. 22.	Dec. 27.	
Do.	Hawthorn, R. and W.	April 7.		
Do.	Bodmer, J. G.	April 20.		
Looking glasses (hanging)	Bielefield, C. F.	Jan. 26.		
Looms	Sievier, R. W.	Oct. 13.	April 3.	April 5.

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Subject.	Name.	England.	Scotland.	Ireland.
Looms	Bullough, James	Nov. 2.	March 4.	
Do.	Hill, John	Feb. 11.		
Do.	Eccles, Samuel, and Curtis, M.	June 22.	Aug. 10.	
Malt, &c. drying	Poole, Alfred	May 25.		
Do.	Knight, S. J.	June 10.		
Do.	Cockson, T. C., and Ball, G.			Sept. 25.
Manganese, obtaining oxides and peroxides of	Walters, G. S.	Mar. 24.	Aug. 16.	July 10.
Manure	Holcombe, C. T.	Oct. 13.		
Match boxes	Rush, H. S.	Dec. 29.	Dec. 29.	
Meridian instruments	Bloxam, J. M.	June 20.		
Metal, joining sheets of	Boydell, James, jun.	July 6.		
Metals, deposition of	Poole, Moses	May 25.		
Do. Do.	Leeson, Henry Beaumont		Dec. 20.	
Do. stamping	Nasmyth, James	July 22.		
Do. coating	Morewood, Edm., and Rogers, George		Aug. 8.	
Mill, flour	Corcoran, Bryan	Aug. 25.		
Mill stones, dressing	Poole, Moses	Dec. 15.	Dec. 22.	May 4.
Mining	Newton, William	Feb. 20.		
Motion, rotary and rectilinear	Booth, James	July 6.		
Motive power	Vaile, H. P.	Dec. 22.		
Do.	Greenstreet, W. J.	Jan. 26.		
Do.	Pilbrow, James	Mar. 7.	Nov. 7.	Nov. 18.
Do.	Neville, James	July 13.		
Do.	Young, Thomas	Aug. 15.		
Do.	Conti, Gaspare	Aug. 22.		
Do.	Baggs, Isham			Oct. 15.
Musical instruments (playing)	Richault, G. S.	Dec. 15.		
Naphtha, purifying spirits of	English, W. O.	Dec. 8.		
Oakum	Trent, Edwin W.		Sept. 29.	
Oils, purifying	Dunn, Arthur	March 28.		
Do.	Wilkes, J. B.	April 4.		
Do.	Billiter, R. H.	May 27.		
Do.	Perkins, A. M.		May 23.	
Omnibuses	Hazledine, George	Oct. 27.		
Ores, dressing	Troughton, Nicholas	June 23.		
Paddle wheels	Smart, Robert	June 8.	July 4.	
Paint	Brown, William	June 3.	May 26.	
Do. (black)	Roberts, M. J.	March 16.		
Painting and graining	Page, Henry	June 10.		
Paper	Wrigley, Thomas	Nov. 8.	Nov. 28.	Jan. 20.
Do.	Brewer, Alfred	Feb. 11.	June 1.	
Do.	Wright, L. W.	June 15.	Sept. 20.	
Do.	Brooman, Richard Archibald	Aug. 10.		
Do.	Brown, William		May 26.	
Do., for prevention of forgery on	Newton, William	June 10.	June 23.	July 5.
Paving	Dotchin, Samuel	Oct. 13.		
Do.	Lillie, Sir J. S.	Nov. 2.	July 19.	
Do.	Harvey, James	Jan. 11.		
Do.	Bennett, T. W.	Jan. 19.		
Do.	Smallwood, E.	Jan. 26.		
Do.	Crannis, Joseph, and Kemp, Robert	Feb. 21.		
Do.	Kettle, J. L. R., and Prosser, W.	May 16.		
Do.	Hartley, J. G.	June 13.		

[PRINTED FOR THE COMPANY OF STATIONERS.]

Subject.	Name.	England.	Scotland.	Ireland.
Paving	York, Jn. O., and Johnson, W.	June 15.		
Do.	Greenshields, William		Mar. 23.	
			Aug. 31.	
Pens and penholders	Mitchell, John	Nov. 8.	Nov. 11.	Dec. 5.
Do.	Longmore, Josiah	May 4.		
Photography	Wolcott, A. S., and Johnson, J.	March 18.		
Do.	Talbot, W. H. F.	June 1.		
Do.	Bourjot, Charles	Aug. 8.		
Pianofortes	Kirkman. Jos., jun.	Jan. 19.		
Do.	Bochet, Henry du	Feb. 11.		
Do.	Stewart, James, and Lambert, Joseph	April 29.		
Piles, driving	Nasmyth, James	July 22.		
Pins	Newton, William	Mar. 6.		
Pipes	Prosser, R., and Cutler, J.	April 20.		
Do. steam	Bevan, Richard	Nov. 5.		
Pistons, metallic	Barker, William	Mar 20.	Mar. 16.	
Ploughs	Bentall, E. H.	June 15.		
Do.	Read, John	June 21.		
Do.	Newton, W. E.	July 13.		
Porcelain	Brown, William	June 3.	May 26.	
Portmanteaus Marine,	Irvine, T. J.	June 15.		
Presses	Cardwell, Thomas	Dec. 15.	Dec. 9.	
Do.	Froisbrioux, Alphonse de	Oct. 20.		
Printing cotton, &c.	Barnes, John, and Mercer, John	Nov. 10.	Aug. 19.	
Do.	Bourlier, J. S.	Dec. 29.	Jan. 12.	April 3.
Do.	Burch, Joseph	May 16.	May 23.	
Do.	Overend, James	July 15.	Aug. 22.	
Do.	Clay, John, and Rosenberg, F.		Nov. 3.	
Do.	Hancock, Charles		Jan. 11.	
			June 13.	
Do., and stereotyping	Mazzini, Joseph	May 16.		
Propelling	Zander, Hinrik	Nov. 8.		
Do.	Grantham, John	Dec. 8.		
Do.	Brown, James	Dec. 8.		
Do.	Parsons, P. M.	Dec. 8.		
Do.	Moreau, G. H.	Dec. 21.	Dec. 27.	Jan 11.
Do.	Hamer, James	Jan. 19.		
Do.	Dundonald, Earl of	Jan. 19.	Aug. 10.	
Do.	Sunderland, Thomas	Jan. 19.		
Do.	Bodmer, J. G.	April 20.		
Do.	Johnson, James	April 20.		
Do.	Walker, Robert, jun.	May 18.		
Do.	Galloway, E.	May 25.		
Do.	Newton, W. E.	June 15.		
Do. (extension of patent)	Lucena, J. L.	July 1.		
Do.	Brunêt, Jas. Joseph	July 6.		
Do.	Maudslay, Jos.	July 13.		
Do.	Pinkus, Henry	July 13.		
Do.	Borrie and Henry	Aug. 3.		
Do.	Firchild, William		Sept. 26.	
Pumps	Bodmer, J. G.	April 20.		
Do., rotary	Crouy, Comte de	Mar. 25.		
Purifying and preserving animal substances, &c.	Carson, Samuel		Oct. 20.	Dec. 29.
Do.	Payne, Charles		March 13.	
Pyro-hydro-pneumatic apparatus	Clark, Charles	Jan. 31.	June 3.	

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Subject.	Name.	England.	Scotland.	Ireland.
Railways	Wydroff, Baron	Dec. 29.		
Do.	Bailey, Crawshay	Jan. 11.		
Do.	Eyres, Edmond	July 26.		
Do.	James, W. H.		March 27.	
Do.	Guitard, C. F.		April 19.	
Railway accidents, prevention of	M'Getrich, F., and Tennant, M. B.	Jan. 26.		
Do.	Paige, Louis Le	June 22.		
Railway carriages	Spinks, John, jun.	Nov. 8.	Nov. 21.	Dec. 5.
Do.	Pandiæ, Theodore R.	Nov. 25.		
Do.	Violette, F. C. M.	April 22.		
Do.	Lipscombe, Frederick	Aug. 17.		
Do.	Bishop, John		Dec. 12.	Dec. 24.
Do.	James, W. H.		March 27.	
Do.	Guitard, C. F.		April 19.	
Railway switches	Wild, C. H.	Dec. 3.	Dec. 7.	
Railway wheels	Wydroff, Baron	Dec. 29.		
Do.	Losh, William		Dec. 9.	
Do.	Banks, Thomas			Oct. 14.
Raising and forcing fluids	White, Charles	March 2.		
Do.	Bodmer, J. G.	April 20.	July 21.	
Do.	Farmer, Richard, and Pitt, Joseph	June 6.		
Do.	Leutz, Ernest	June 10.	Aug. 3.	
Razor Strop	Edwards, Jos.	Nov. 2.		
Reefing sails	Winspear, John	April 27.		
Registering the number of passengers in carriages, &c.	Ranwell, William	April 13.		
Rigging, fixing and securing	Green, John James	July 1.	July 14.	
Roads and streets, cleaning	Geary, Stephen	July 13.		
Do.	Whitworth, Jos.		Sept. 2.	Nov. 1.
			Mar. 22.	
Roofs	Loat, W. J.	Jan. 12.		
Do.	Napier, James	April 11.		
Do.	Parsons, George	July 7.	July 26.	
Do.	Davey, William	July 31.		
Do. (metal)	Boydell, James, jun.	July 6.		
Rotary machines (worked by water)	Whitelaw, James, and Stirrat, James			Oct. 19.
Saddles	Shipley, J. G.	Oct. 6.		
Salt	Gibson, J. B.	May 25.		
Screws, screw-blanks, and rivets	Newton, W. E.	Aug. 31.		
Ships and vessels	Newton, W. E.	May 30.		
Do.	Guppy, T. R.	June 15.		
Do.	Laird, John	July 10.	Aug. 16.	
Do. (loading)	Day, J. W.	July 6.		
Do. (and raising)	Wood, John	Aug. 14.	Aug. 23.	
Shipwreck, prevention of loss of life by	Catlin, George	Sept. 4.		
Shot	Rolinson, Solomon	March 20.		
Shower Bath	Hill, Arthur	May 27.		
Slates for roofing	Bidder, G. P.	Jan. 26.		
Smelting	Longmaid, William	Oct. 20.	Mar. 13.	May 4.
Do.	Michell, John	April 11.		
Do.	Bouissons, E. J. F. de	June 10.		
Do., copper	Newton, William	May 30.		
Soda	Kneller, W. G.	Dec. 22.		
Do., sulphates of	Seybell, Julius			Oct. 15.
Spinning	Hyde, John and James	Sept. 29.	Nov. 23.	
Do.	Seville, Thomas	Oct. 20.	Dec. 9.	
Do.	Howard, Thomas	Dec. 3.	Mar. 11.	
Do.	Fothergill, Benjamin	Dec. 8.		
Do.	Kirk, Samuel	Jan. 31.		

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Subject.	Name.	England.	Scotland.	Ireland.
Spinning	Fletcher, James	Mar. 30.	Mar. 27.	
Do.	Tappan, John	May 15.	June 5	
Do.	Smith, J. B.	June 8.	Aug. 19.	
Do.	Taylor, W. G.	July 15.		
Do.	Roberts, M. J.		June 8.	
Springs	Walker, William	March 2.		
Stairs and steps	Tupper, A. C.	March 16.		
Stays and belts	Wise, Ann	July 13.		
Steam cocks	Bishop, John	Dec. 29.	Dec. 12.	Dec. 24.
Steam engines	Zander, Hinrick	Nov. 8.	May 2.	
Do.	Brown, James	Dec. 8.		
Do.	Parsons, P. M.	Dec. 8.	May 31.	
Do.	Wilson, Robert	Dec. 22.	Dec. 27.	
Do.	Morris, James	Dec. 22.	Dec. 27.	Dec. 30.
Do.	Bishop, John	Dec. 29.		
Do.	Harvey, James, jun.	Jan. 11.		
Do.	Dundonald, Earl of	Jan. 14.	Aug. 10.	
Do., rotary	Crouy, Comte de	Mar. 25.	April 28.	
Do.	Hawthorn, Messrs.	April 7.		
Do.	Byrom, James	April 19.	April 3.	May 2.
Do.	Bodmer, J. G.	April 20.	July 21.	
Do.	Christian, C. T.	June 27.		
Do.	Waller, Richard	June 27.		
Do. (extension of E. Galloway's patent)	Lucena, J. L.	July 1.	July 20.	
Do.	Delcroix, F., jun.	July 6.		
Do.	Samuda, Jacob	July 10.		
Do.	Westenholz, F. L.	July 25.		
Do.	Borrie and Henry	Aug. 3.		
Do.	Bennetts, George	Aug. 15.		
Do.	Connison, Alexander	March 3.		
Do.	Varley, John, and Edmondson, R.		Oct. 26.	Mar. 15.
Stereotyping and printing	Mazzini, Jos.	May 16.		
Stone, artificial	Bertram, Charles	July 25.		
Stone cutting machinery	Hutchinson, William	July 13.		
Do.	Wollaston, C. J.	Aug. 1.	Aug. 3.	
Stop cocks	Medworth, William	July 13.		
Stove	Pope, William	Dec. 6.		
Stretching frame	Morand, Samuel		Sept. 12.	
Sugar	Target, Castelain, and Aubril	Nov. 25.		
Do.	Pouchant, Don Pedro	Dec. 3.	Dec. 7.	
Do.	Crosley, H., and Stevens, G.	Dec. 28.		
Do.	Ritter, William	Jan. 11.		
Sulphur	Rodgers, J. E. D.	June 12.	Jan. 25.	Feb. 18.
Sulphuric acid	Sautter, C. M. E.	Dec. 15.	Dec. 7.	Dec. 30.
Do.	Kneller, W. G.	Dec. 22.		
Swimming	Cobbold, Edward	April 20.		
Do.	Pigot, R. G.	April 25.		
Tanning	Cox, John			Nov. 18.
Teapots	Ashe, H. C.	July 6.		
Telegraphic signals	Hughes, J. G.		Sept. 2.	
Tile, improved	Sealy, John	Dec. 3.		
Do., ornamental	Francis, A., and Funge, Isaac	June 10.		
Tubes, metal	Rand, John	April 26.		
Do., welded iron	Roose, James	May 9.		
Tunnelling	Franchot, C. L. F., and Motay, C. M. T. du	Aug. 31.		
Turntables	Ellis, Samuel	June 22.	Aug. 3.	
Turpentine, purifying spirits of	English, W. O.	Dec. 8.		

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Subject.	Name.	England.	Scotland.	Ireland.
Types	Duncan, John	June 26.		
Tyres for wheels	Bodmer, J. G.	Dec. 8.	Dec. 19.	Jan. 27.
Do.	Banks, Thomas			Oct. 14.
Velvet	Williams, Rowland	Oct. 27.		
Veneers	Gregson, Matthew	Nov. 2.	Jan. 16.	Dec. 10.
Viaducts	Franchot, C. L. F., and Du Motay, C. M. T.	Aug. 31.		
Vinous fermentation	Harvie, Arthur	Nov. 8.		
Wadding for fire arms	Brockedon, William	April 25.		
Warming apartments	Brouillet, P. P.	Mar. 30.		
Warping machines	Kenworthy, William	Mar. 11.	Sept. 13.	
Watches	Ingold, Pierre Fred.	Nov. 8.		
		June 1.		
Waterclosets	Farmer, Richard, and Pitt, Joseph	June 6.		
Do.	Austin, Henry	July 20.		
Waterproofing	Hancock, Charles	Jan. 31.		
Wearing apparel, fastenings for	Frearson, John	March 2.		
Do.	Mills, William	May 16.		
Do.	Beater, J. G.	July 20.		
Do.	Thomas, William	Sept. 16.		
Weaving	Smith, James	Nov. 25.		
Do.	Thompson, Thomas	Dec. 28.	Jan. 23.	Feb. 18.
Do.	Wood, William		Jan. 13.	
Do. and sizing warps	Ridsdale, John	Sept. 29.	Oct. 20.	Dec. 24.
Weighing Machines	Goodacre, Robert	Jan. 26.		
Do.	Ellis, Samuel	June 22.	Aug. 3.	
Do.	Craig, John		Feb. 28.	
Whalebone substitute for	Davidge, Jos. Dan.	July 24.	July 17.	
Wheels	Banks, Thomas			Oct. 14.
Do.	Bodmer, J. G.			Jan. 27.
White lead	Mullins, John	Oct. 27.		
Window sashes hanging	Barrow, John	Jan. 28.		
Do. opening, shutting, and fastening	Boddy, W. B.	Jan. 31.		
Do. blinds	Bate, George	June 15.		
Do. shutters	Horn, Archibald	Aug. 15.		
Wire ropes	Newall, R. S.	March 7.		
Wood cutting and shaping	Conder, Francis R.	Feb. 23.	Nov 9.	
			Aug. 9.	
Do.	Chilton, Charles, and Braithwaite, Fred.	Mar. 16.		
Do.	Smith, Junius	June 3.		
Do.	Ingram, Thos. Wells	June 10.		
Do.	Allen, Matthew			May 13.
Do. (preservation of)	Parkes, Alexander	June 27.		
Woolcombing	Ross, Henry	Feb. 17.		
Do.	Donisthorpe, G. E.	June 15.	Dec. 12.	Dec. 30.
Do.	Preller, C. A.		Dec. 9.	Oct. 6.
Wool, winding	Roberts, Martin, J.	June 1.		
Zink	Vivian, H. H., and Gosage, W.	Jan. 14.		

COPYRIGHT OF DESIGNS. — EXTENSION TO ARTICLES OF UTILITY.

ACT TO AMEND THE LAWS RELATING TO THE COPYRIGHT OF DESIGNS, 6 & 7 VICT. C. LXV.

Preamble. — Whereas by an Act passed in the fifth and sixth years of the reign of her present Majesty, intituled "An Act to consolidate and amend the laws relating to the copyright of designs for ornamenting articles of manufacture," there was granted to the proprietor of any new and original design, with the exceptions therein men-

tioned, the sole right to apply the same to the ornamenting of any article of manufacture, or any such substance as therein described during the respective periods therein mentioned: and whereas it is expedient to extend the protection afforded by the said Act to such designs hereinafter mentioned, not being of an ornamental character, as are not included therein.

Commencement of the Act.—I. Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that this Act shall come into operation on the first day of *September* one thousand eight hundred and forty-three.

Extension of Copyright to Articles of Utility.—II. And with regard to any new or original design for any article of manufacture having reference to some purpose of utility, so far as such design shall be for the shape or configuration of such article, and that whether it be for the whole of such shape or configuration, or only for a part thereof, be it enacted, that the proprietor of such design not previously published within the United Kingdom of *Great Britain* and *Ireland*, or elsewhere, shall have the sole right to apply such design to any article, or make or sell any article according to such design, for the term of three years, to be computed from the time of such design being registered according to this Act: provided always, that this enactment shall not extend to such designs as are within the provisions of the said Act, or of two other Acts passed respectively in the thirty-eighth and fifty fourth years of the reign of his late Majesty King George the Third, and intituled respectively "An Act for encouraging the art of making new models and casts of busts, and other things therein mentioned," and "An Act to amend and render more effectual an Act for encouraging the art of making new models and casts of busts, and other things therein mentioned.

Conditions of extension of Copyright—Articles to be registered before publication, and to be marked.—III. Provided always and be it enacted, that no person shall be entitled to the benefit of this Act unless such design have before publication thereof been registered according to this Act, and unless the name of such person shall be registered according to this Act as a proprietor of such design, and unless after publication of such design every article of manufacture made by him according to such design, or on which such design is used, hath thereon the word "registered," with the date of registration.

Penalty for wrongfully using Marks.—IV. And be it enacted, that unless a design applied to any article of manufacture be registered either as aforesaid or according to the provisions of the said first-mentioned Act, and also after the copyright of such design shall have expired, it shall be unlawful to put on any such article the word "registered," or to advertise the same for sale as a registered article; and if any person shall so unlawfully publish, sell, or expose or advertise for sale any such article of manufacture, he shall forfeit for every such offence a sum not exceeding five pounds nor less than one pound, which may be recovered by any person proceeding for the same by any of the remedies hereby given for the recovery of penalties for pirating any such design.

Floor or Oil Cloths to be included in Class Six of former Act.—V. And be it enacted, that all such articles of manufacture as are commonly known by the name of floor cloths or oil cloths, shall henceforth be considered as included in class six in the said first-mentioned Act in that behalf mentioned, and be registered accordingly.

What Provisions of former Act are to extend to the present.—VI. And be it enacted, that all and every the clauses and provisions contained in the said first-mentioned Act, so far as they are not repugnant to the provisions contained in this Act, relating respectively to the explanation of the term proprietor, to the transfer of designs, to the piracy of designs, to the mode of recovering penalties, to actions for damages, to cancelling and amending registrations, to the limitation of actions, to the awarding of costs, to the certificate of registration, to the fixing and application of fees of registration, and to the penalty for extortion, shall be applied and extended to this present Act as fully and effectually, and to all intents and purposes, as if the said several clauses and provisoes had been particularly repeated and re-enacted in the body of this Act.

Appointment of Registrar and other Officers.—VII. And be it enacted, that so much of the said first-mentioned Act as relates to the appointment of a registrar of designs for ornamenting articles of manufacture and other officers, as well as to the fixing of the salaries for the payment of the same, shall be and the same is hereby repealed; and for the purpose of carrying into effect the provisions as well of this Act as of the said first-mentioned Act, the lords of the committee of the privy council for the consideration of all matters of trade and plantations may appoint a person to be registrar of designs for articles of manufacture, and, if the lords of the said committee see fit, an assistant registrar and other necessary officers and servants; and such registrar, assistant registrar, officers, and servants shall hold their offices during the pleasure of the lords of the said committee; and such registrar shall have a seal of office; and the commissioners of her Majesty's treasury may from time to time fix the salary or other remuneration of such registrar, assistant registrar, and other officers and servants; and all the provisions contained in the said first mentioned Act, and not hereby repealed, relating to the registrar, deputy registrar, clerks, and other officers and servants thereby appointed

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and therein named, shall be construed and held to apply respectively to the registrar, assistant registrar, and other officers and servants to be appointed under this Act.

Forms of Registration.—VIII. And be it enacted, that the said registrar shall not register any design for the shape or configuration of any article of manufacture as aforesaid, unless he be furnished with two exactly similar drawings or prints of such design with such description in writing as may be necessary to render the same intelligible according to the judgment of the said registrar, together with the title of the said design, and the name of every person who shall claim to be proprietor, or of the style or title of the firm under which such proprietor may be trading, with his place of abode, or place of carrying on business, or other place of address; and every such drawing or print, together with the title and description of such design, and the name and address of the proprietor aforesaid, shall be on one sheet of paper or parchment, and on the same side thereof; and the size of the said sheet shall not exceed twenty-four inches by fifteen inches; and there shall be left on one of the said sheets a blank space on the same side on which are the said drawings, title, description, name, and address, of the size of six inches by four inches, for the certificate herein mentioned; and the said drawings or prints shall be made on a proper geometric scale; and the said description shall set forth such part or parts of the said design (if any) as shall not be new or original; and the said registrar shall register all such drawings or prints from time to time as they are received by him for that purpose; and on every such drawing or print he shall affix a number corresponding to the order of succession in the register, and he shall retain one drawing or print which he shall file at his office, and the other he shall return to the person by whom the same has been forwarded to him; and in order to give a ready access to the designs so registered, he shall keep a proper index of the titles thereof.

Registrar empowered to refuse Registration in certain cases.—IX. And be it enacted, that if any design be brought to the said registrar to be registered under the said first mentioned Act, and it shall appear to him that the same ought to be registered under this present Act, it shall be lawful for the said registrar to refuse to register such design otherwise than under the present Act, and in the manner hereby provided; and if it shall appear to the said registrar that the design brought to be registered under the said first-mentioned Act or this Act is not intended to be applied to any article of manufacture, but only to some label, wrapper, or other covering, in which such article might be exposed for sale, or that such design is contrary to public morality or order, it shall be lawful for the said registrar, in his discretion, wholly to refuse to register such design: provided always that the lords of the said committee of privy council may, on representation made to them by the proprietor of any design so wholly refused to be registered as aforesaid, if they shall see fit, direct the said registrar to register such design, whereupon, and in such case the said registrar shall be and is hereby required to register the same accordingly.

Inspection of Index of Titles of Designs, &c.—X. And be it enacted, that every person shall be at liberty to inspect the index of the titles of the designs, not being ornamental designs registered under this Act, and to take copies from the same, paying only such fees as shall be appointed by virtue of this Act in that behalf; and every person shall be at liberty to inspect any such design, and to take copies thereof, paying such fee as aforesaid; but no design whereof the copyright shall not have expired shall be open to inspection, except in the presence of such registrar, or in the presence of some person holding an appointment under this Act, and not so as to take a copy of such design, nor without paying such fee as aforesaid.

Interpretation of the Act.—XI. And, for the interpretation of this Act, be it enacted, that the following terms and expressions, so far as they are not repugnant to the context of this Act, shall be construed as follows; (that is to say,) the expression "commissioners of the treasury" shall mean the lord high treasurer for the time being, or the commissioners of her Majesty's treasury of the United Kingdom of Great Britain and Ireland for the time being, or any three or more of them; and the singular number shall include the plural as well as the singular number, and the masculine gender shall include the feminine gender as well as the masculine gender.

TABLE OF FEES.

	Stamp.	Fee.	Total.
	£ s. d.	£ s. d.	£ s. d.
Registering Design	5 0 0	5 0 0	10 0 0
Certifying former Registration.....	5 0 0	1 0 0	6 0 0
Registering and Certifying Transfer	5 0 0	1 0 0	6 0 0
Cancellation or Substitution	0 0 0	1 0 0	1 0 0
Inspecting Index of Titles	0 0 0	0 1 0	0 1 0
Inspecting Designs (expired Copyrights), each vol. .	0 0 0	0 1 0	0 1 0
Taking Copies of ditto, each Design	0 0 0	0 2 0	0 2 0
Inspecting Designs (unexpired Copyrights), each Design	0 0 0	0 5 0	0 5 0

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NOTICE.

COPYRIGHT OF DESIGNS FOR ARTICLES OF UTILITY.

Designs Office, 9th September, 1843.

As the Act 6 & 7 Vict. c. 65. applies only to the *shape or configuration* of articles of utility, and not to any *mechanical action, principle, contrivance*, or *application* (except in so far as these may be dependent upon, and inseparable from, the shape or configuration), NO Design will be registered the description of which shall contain *a claim* for any such mechanical action, principle, contrivance, or application.

With this exception *all* Designs, the drawings and descriptions of which are properly prepared and made out, will be registered, *without reference to the nature or extent of the copyright sought to be thereby acquired; which considerations must be left entirely* TO THE JUDGMENT AND DISCRETION OF THE PROPRIETOR OF THE DESIGN.

Parties are strongly recommended to read the Act before determining to register their Designs, in order that they may be satisfied as to the nature, extent, and comprehensiveness of the protection afforded by it, of which the registration will not constitute any guaraotee.

By order of the Registrar,
J. H. BOWEN, CLERK.

ADVANTAGES OF THIS ACT.

First, the Act establishes a copyright in "*any* new and original design for *any* article of manufacture having reference to *some purpose of utility*, so far as such design shall be for the *shape* or *configuration* of such article, and that whether it be for the whole of such shape or configuration, or only for a part thereof."

In the former Designs Act, the words "*external* shape or configuration" were used; but here there is no qualification whatever. The shape and configuration may be either *external* or *internal*.

Again, the designs must have reference to "some purpose of *utility*." But how few are the things which can be produced by the hand of man, which have not "*some* purpose of utility" for their object! Many things may have utility in them, besides those which serve directly to lessen the labour, or to augment the stored wealth, of a people. He was a useful inventor who first changed a spear into a pruning-hook, but so also is he who converts an implement of destruction into anything else, however frivolous; or who, by any sort of device, makes pride, or fashion, or folly, contribute to the encouragement and sustenance of honest industry.

It is difficult, indeed, to imagine any cases of mechanical improvement which will not come within the exceedingly comprehensive terms of this Act. Such an invention as Watt's great discovery of condensing in a separate cylinder might possibly fall without the line; but the direct-acting engine, the oscillating engine, and a score of others of the like character, would as undoubtedly fall within it. All paddle-wheels and all stern-propellers would be most clearly included. So would all agricultural machines; all railway bars, chairs, sleepers, &c.; all wood pavements. In short, mere processes only, and such chiefly as are of a chemical description, will be excluded.

It is further deserving of notice that the design may be for "*any* article of manufacture having reference to some purpose of utility." The former Designs Act drew distinctions between articles, according as they were in metal, or wood, or glass, or clay, or paper, &c.; but in the present Act all such distinctions are wisely thrown overboard. The abstract design, in which only there can be any merit, is the only thing looked to. No matter what the article is made of, if it be only an article of utility, and designed in a new manner, the present Act will protect it against all piratical imitators.

Secondly, the copyright is to exist for "the term of three years." This is less by many years than it ought in justice to be; but we may hope to see it ere long extended. It is a valuable *instalment* at any rate. But though the term is short, there is this to be observed on the other hand, that it is a term of three years for ALL THE THREE KINGDOMS, ENGLAND, SCOTLAND, AND IRELAND. To secure by LETTERS PATENT the right to an invention for fourteen years (all patents being for this term neither less nor more), for the three kingdoms, a person must take our separate letters patent for each, and incur altogether an expense of about 400*l*. (including specifications), which is about equal to 80*l*. for every three years of the period. Now under the present Act he may secure a three years' protection, extending over all the three kingdoms, for less, in most cases, than 15*l*., or one-fourth of the present expense. And this, too, on demand—by one brief course of proceeding—one application, one specification, one payment, one certificate.

And though three years be truly a brief period of protection, it will, in a great many cases, be found long enough to enable an inventor to introduce an invention to public notice, and to establish a connexion for it which will last him his lifetime; while, if he had been obliged to pay 400*l*., or supposing he took out a patent for England alone, 130*l*., before he could move a step, his invention might never have seen the light at all, or been of the least benefit either to his country or to himself.

Thirdly, the copyright is to be granted to the "*proprietor* of the design." He may be the proprietor either by right of invention, or by right of purchase. *Patents* can be taken out in the name of the

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actual inventor only — a circumstance which often prevents most meritorious inventions from obtaining the sort of patronage which they are most in need of, and is, in all cases of joint proprietorship, productive of a good deal of trouble and expense. The number of persons can be but few who cannot themselves command 15*l.* to obtain a three years' copyright of an invention; and the number still fewer who will not find it an easy matter to obtain a good price for any really useful thing, when a purchaser can by so simple, cheap, and expeditious a process as the present Act provides, have the legal estate in it transferred into his own name.

Lastly, the remedy for the piracy of designs registered under this Act is cheap and expeditious beyond all past example in matters of this sort. No occasion for long bills in Chancery, or tedious trials at law; no 500*l.* and 1000*l.* bills of cost to enforce a simple matter of right. An injured party has but to make his complaint before any two justices of peace in his neighbourhood, who are empowered (by the previous Designs Act, the provisions of which are extended to the present, to enquire into the whole matter, and to convict the offender in a penalty of from 5*l.* to 30*l.* *for each offence*, besides costs, "provided the aggregate amount of penalties for offences in respect of any one design, committed by any one person, *up to the time at which the proceedings shall be instituted, shall not exceed* 100*l.*" If one conviction does not suffice to put down a piracy, a second may be had, and so on as often as a new offence, or batch of offences, is committed; the expense in each case not probably exceeding 5*l.* We do not imagine there could arise many cases, in which such a summary course of justice as this would not be found amply sufficient for the protection of an inventor; but as piracy might occasionally take place, in a day, or week, to an extent far exceeding the maximum amount of penalties which the justices are allowed to inflict — as, for example, by throwing on the market all at once two or three thousand fraudulent imitations of a registered design — the right is reserved to the injured party of bringing an action at common law for damages, if he shall elect so to do. [For List of Articles of Utility registered under this Act, see p. 37.]

TABLE OF CURRENT BRITISH COINS.

Gold.	Value.	Weight.	Silver.	Value.	Weight.
	£ s. d.	oz. dwt. gr.		£ s. d.	oz. dwt. gr.
Five sovereign piece -	5 0 0	1 5 16·37	Crown -	0 5 0	0 18 4·36
Double sovereign -	2 0 0	0 10 6·548	Half crown -	0 2 6	0 9 2·18
Guinea -	1 1 0	0 5 9½	Shilling -	0 1 0	0 3 15·27
Sovereign -	1 0 0	0 5 3·274	Sixpence -	0 0 6	0 1 19·63
Half guinea -	0 10 6	0 2 16½	Groat -	0 0 4	0 1 4·36
Half sovereign -	0 10 0	0 2 15·637	Copper.		oz. drs.
Seven shilling piece -	0 7 0	0 1 19·	Penny -	0 0 1	1 0
			Halfpenny -	0 0 0½	0 8
			Farthing -	0 0 0¼	0 4

The sovereign is coined at the rate of 1869 sovereigns from 40 troy pounds of metal of the standard fineness of 22 carats, or $\frac{11}{12}$ths; hence gold is minted at 3*l.* 17*s.* 10½*d.* per troy ounce, and the full weight of the sovereign is 5 dwts. 3·274 grains.

The silver coins are all coined at the rate of 66 shillings from 1 troy pound of metal of the standard fineness of 11 oz. 2 dwts., or $\frac{37}{40}$ths; hence silver is minted at 5*s.* 6*d.* per troy oz.; being an increase of 4*d.* per oz. from the rate prior to 1816, which was 5*s.* 2*d.*; and the full weight of the shilling is 3 dwts. 15$\frac{1}{2}$ grains.

A few threepenny, twopenny, and one penny silver pieces, called *Maundy money*, are also issued annually from the mint, but they are not in general circulation.

The copper coins are issued at the rate of 24 pence from 1 lb. avoirdupois of metal, or 24*l.* per ton.

No seignorage is exacted on gold coins, as they are minted at the market value of that metal; but on silver coins a seignorage is levied of nearly 10 per cent. (the mint price being 5*s.* 6*d.*, and the market price only about 5*s.* per oz.), while on copper coins it amounts to more than 100 per cent. It was enacted, however, by the act 56 Geo. 3. c. 68., under which the existing coinage is regulated, that silver coins shall be a legal tender only for 40*s.* at one time, copper coins for 12 pence only, and that gold coins shall be in future the sole standard measure of value and legal tender for payment without any limitation of amount.

Coins of gold and silver, and the inferior metals are found in this country, that are usually attributed to the very ancient British kings; but the earliest coin of any importance was the silver penny, which was common in most European kingdoms, and usually bore the device of a cross.

In England the silver penny has been coined from A. D. 688 to the present time; and it affords the best rule for valuing the other silver coins, as it has always formed the 240th part of the nummary pound sterling. At first the pound sterling consisted o

a Saxon pound, or 5400 troy grains of standard silver (equivalent to 1*l.* 1*s.* 4*d.* from the troy pound, which is $\frac{1}{15}$th heavier); and the weight of the penny was $22\frac{1}{2}$ troy grains; this was reduced in 1386 to 18; in 1421 to 15; and in 1424 to 12 grains. Its subsequent reductions were in 1527 to $11\frac{1}{2}$; in 1543 to 10; in 1551 to 8; in 1601 to 7 $\frac{23}{31}$ and 1616 to $7\frac{3}{11}$ grains. The standard for silver has been 11 oz. 2 dwts. since the Conquest (1066), except for the short period from 1543 till 1560. From 1344 to 1527 the standard for gold was 23 carats $3\frac{1}{2}$ grains. Considerable fluctuations afterwards took place, but in 1604 it was fixed permanently at 22 carats. Before 1816 the principal coin of the new standard was the guinea, first coined in 1666, and which was minted at the rate of $44\frac{1}{2}$ to 1lb. troy.

Formerly silver was a legal tender to any amount, as well as gold; and the relative value of the coins was subject to variation with the market price of these metals. The number of shillings in the guinea, fluctuated from 20 to 30 until 1717, when it was permanently fixed at 21. This was an overvaluation of gold to the extent of about $1\frac{1}{2}$ per cent.; a difference which afterwards increased, and led before the end of the century to the fusion or exportation of all silver coins of full weight, and the exclusive use of gold in large payments. Prior to the reform of the coinage in 1816, much discussion arose as to whether gold or silver or both metals should be employed as the standard of value; but at length this was for the time decided by the "Treatise on the Coins of the Realm," by the late Earl of Liverpool, who maintained "that coins, which are the principal measures of property, should be of one metal only; that this metal should be gold (being that in which the principal payments in England are made); and that the expences of fabrication should be taken out of the silver and copper coins." These principles were made the basis of the act 5 & 6 Geo. 3. c. 68.

ON THE MANAGEMENT OF COMMON BEE-HIVES.

BY THE REV. WILSE BROWN.

THE following is a plan for managing bees in common straw hives, so as to obtain a portion of honey without destroying them:—

Put a swarm into a hive, with a hole in the top, closed with a cork. Nail a piece of wood 4 inches long, 3 wide, and $\frac{1}{2}$ an inch thick, on one side of the hive, at the bottom, cutting a hole $1\frac{1}{2}$ inch long, and $\frac{1}{2}$ inch high, through the lower edges of the wood and hive. Attach a similar piece of wood to a second hive, and insert a pipe of tin, full of small holes, through the top of this hive. The pipe may be made by simply bending half a sheet of tin round a roller 2 inches in diameter, nailing the upper end into a ring of wood, and closing the bottom with a wooden plug. The wooden ring must be outside the hive, and must have a wooden cover. It is intended by this pipe to ventilate the hive, and its size allows a thermometer to be kept in it.

Place both these hives, with the pieces of wood in contact, on a board 1 inch thick, 3 feet long, 18 inches wide, inserting a slip of tin between the pieces of wood to cut off the communication between the hives.

The most effectual protection to the hives, is given by a well painted canvass cover 1 yard square, nailed in front and back to wooden rods. In this cover, holes about 4 inches in diameter should be cut to correspond with the pipe and cork in the top of the hives. A canvass cover, made like a cone, nailed to a knob of wood at the top, and sewn to a thick iron wire at the base, must be placed over each hole in the large cover. White paint must be used, as it does not attract the heat. The great expense of bee boxes, (far beyond the means of cottagers,) led me to contrive the above plan in the spring of 1842; it costs about 8 shillings, and can be executed by any person.

I will now state the success I had with it last summer.

In April, 1842, I fitted a hive of bees, swarmed in June, 1841, with the second or store-hive, and marked it A.

One swarm came off, which was fitted up in the same manner, and marked A a.

About the middle of July the bees were allowed to enter the hives at the side, the breeding-hives being nearly full.

In the middle of September I inserted the pieces of tin again between the hives, by which I confined in the store-hives all the bees that were in them.

I then opened a door into the air from each store-hive, which I covered with a thin slip of wood, with a hole in it large enough to allow one bee to pass at a time. Over this hole I hung by a thread on the outside, a piece of talc. The bees pushed the talc open, as they made their escape, but could not get back again into the hive.

In the course of a few hours all the bees, except twelve, had escaped, and returned to the breeding-hive in A a.

The queen was in the store-hive of A, and consequently I was obliged to smoke the bees out; many died, but the queen survived, and was replaced in the breeding-hive.

From A a I obtained 16 lbs. of the finest honey, free from young bees, or bee-bread, without killing a single bee.

From A I obtained 10 lbs. of honey, equally pure and good with that from A a.

The trap-door of talc was a contrivance of Mr. Nutt, the author of the interesting work on bees.

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THE WATER POWER OF GREAT BRITAIN.

In estimating numerically, in any known measures, the average quantity of water which rises from the earth in vapour, descends upon it in rain, or exists in the atmosphere, there are imperfections in the data, and other difficulties, which reduce the conclusions to mere approximations; and even as such they are far from satisfactory, though, so far as observation and experience have gone, there is some agreement between them and the theories.

According to the calculations, the average quantity of water suspended in the atmosphere, if it were all precipitated to the surface of the land and sea, would amount to four inches in depth, or 11,794 cubic miles of water. This is greatest at the equator, being about 8¾ inches, while at the poles it is only about 1½; in the average latitude of Britain it is about 2½ inches. The quantity of rain which falls would follow the same law, if it were not that different surfaces do not equally supply the same evaporating power. The average annual depth of rain for Britain, according to the experiments of Dr. Dalton and others, may be taken at 30 inches. This supplies all the springs, and all the water which works on the surface of the earth, including streams and rivers, and their floods; and the quantity discharged annually into the sea is estimated at about 13 inches depth in the year, but here it will be no great error if, for the sake of simplifying the calculation, it is taken at 12 inches, or four-tenths of the average fall of rain.* The surface of the British islands, in round numbers, as already hinted, is 77,000,000 acres, and, at the average given, it would be easy to calculate the quantity of water which falls upon it during any given time. If, however, the power of this water is sought, a smaller but indefinite breadth of land must be taken, because there are some places which discharge no water, and others where it cannot be rendered available as a power. Say that the total breadth, in all the lands in Britain from which it is available, is 50,000,000, and that for England and Wales 20,000,000; and, making allowance for waste, one foot in depth of water over each of these is a power, whether it can be turned to account or no.

The first gives 2,178,000,000,000 cubic feet of water; and the second, 871,200,000,000 cubic feet.

To reduce these, or either of them, into horse-power, there is this datum, according to the ordinary estimates, about 37½, say 38, cubic feet of water, falling every minute on an overshot wheel of 10 feet diameter, is reckoned the power of one horse. Divide each of these numbers by 525,960, the minutes in a year, and the first is the cubic feet for all Britain in each minute, and the second the same for England and Wales. Divide, again, by 38, and the results are the horse-power, that for the whole islands being a constant power of 108,975, and that for England, 43,590. This, however, supposes the water-power to be only on a ten-feet wheel, and that wheel to be in motion every minute in the year.

But in no one instance will such be the case. 12 hours in the day will be the utmost length of working, and ⅓th of the year will suffice for ordinary farm work, and this gives 12 times the above number, or 523,080 horse-power. But this is supposing only a single ten-feet fall; and every additional ten feet doubles the power. Say that the average of falls, one with another, in England and Wales, is 50 feet, and the total horse-power working, as above stated, will be upwards of 2,000,000. This is for the surface water alone; and if the floods were conserved in tanks and reservoirs, judiciously placed, and of proper size, this power would be increased, and a great saving of alluvial matter effected; but there are no satisfactory data for calculating the amount.*

Then for the water which will be obtained by general drainage over and above the quantity which escapes from the lands, there are absolutely no data whatever, for that must depend on the breadth of land which is drained, and the quantity of water afforded by the subsoil springs. It has been calculated that, where the land before draining is very moist, the drainage water will irrigate, in a proper manner, one-fifth as much water meadow as the land drained.† But this is too much for the average of England, and we must not allow more than one-eighth, and perhaps one-tenth would be nearer the truth.

The usual estimate is, that 10,000,000 of the 12,000,000 acres of arable land in England and Wales require drainage; and in order to carry the system of irrigation as far up the hills as possible, 10,000,000 more out of the residue, and which require draining, would be added to that amount. All this could not be done in a year, or probably in a century; but it is a result which could be aimed at, and therefore it may be kept in view. Water sufficient to irrigate about 20 acres would, on a wheel 20 feet in dia-

* Prize Essays of the Highland Society, vol. vi. — On the Construction of Reservoirs of Water for Agricultural Purposes. By Messrs. James Adam and Fmdlater.

The depth of 12 inches is quoted, without acknowledging that it is correct: it is believed to be much more.

* The alluvial soil deposited by the waters of the Nile, according to Major Rennel, is 14,784,000 solid feet per hour; and by the Ganges, 2,509,056,000 solid feet per hour.

The Mississippi deposits 8,000,000 solid feet per hour; and the Koangho, according to Barrow, carries into the sea 2,000,000 solid feet of sediment every hour.

† See page 34. of the 4th Report of the Commissioners on the nature and extend of the bogs in Ireland.

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meter, give one horse-power; and if we divide by this, the 2,000,000 acres, irrigated by the drain water of 20,000,000 acres, it would give us a power of 100,000 horse-power, upon a single fall of 20 feet. But when tanks and reservoirs are used, the last, if there are more than one, should be made to answer as mill-ponds. During heavy rain this would retain the flood water and the substances with which it was charged, and thus conserving both the fertilising and the mechanical power in those places where they might be most advantageously applied. *Denton's "What can be done for British Agriculture."*

THAMES TUNNEL.

After being in course of construction for a period of seventeen years, this undertaking has at length been so far completed as to be opened for foot-passengers. The original calculation was, that it would pay 4 per cent. on an expenditure of about 250,000*l.*; the actual cost (when the carriage-ways are completed) will be not less than 620,000*l.* The excavation made for the tunnel was thirty-eight feet broad, and twenty-two feet six inches high, presenting a sectional area of 850 feet; the interior horizontal diameter of each arch is thirteen feet nine inches; and fifteen feet four inches vertical; depth at the shaft on the Rotherhithe side, sixty-three feet, and declining towards the centre of the river two ft. three inches per 100 feet; the base in the deepest part being seventy-six feet below high-water mark; the length is 1200 feet.

ON THE MEANS EMPLOYED IN DIFFERENT COUNTRIES FOR THE PROMOTION OF MANUFACTURES AND THE MECHANIC ARTS, AND OF THE INTELLECTUAL IMPROVEMENT OF THEIR CULTIVATORS.

[*From an Address delivered by Professor Bache, at the Exhibition of American Manufactures, October, 1842, published at length in the "Franklin Journal," and deserving of universal attention for its sound and enlightened views.*]

The traveller in the deserts of Syria, resting at one of those few favoured spots where the turf shows the presence of the refreshing well, and the date palm gives him shade, finds himself amid the ruins of a great city. Broken columns — architraves, and fragments of pediments half imbedded in the sand — heaps of ruins, indicating the former existence of massive structures, and deluding him with the idea that even now he may trace the extent and form of the space once occupied by the dwellings of men — all speak of the magnificence, the grandeur, and the vastness, of a great commercial capital. He is amid the ruins of Tadmor of the wilderness, Palmyra, the great commercial emporium of former days — now part of the greater desert. Here was once the entrepôt of the commerce of the east and west and here arose a city — as it were one vast temple to that commerce, which linked together the far east and west.

Amid the lagunes and marshes at the head of the Adriatic, the gorgeous fane and splendid palace are reared, and the varied ornaments of a florid architecture are lavished to decorate the homes of the merchant nobles. The very difficulties of the site are made to contribute to luxury; no noise of wheels disturbs the quiet of home, or the hum of business on the Rialto; but the luxurious gondola glides silently through the vast canals which connect the distant quarters of this queen of the sea. Commerce has been again at her work. Civilisation has advanced westward; and while Tadmor is crumbling, and the sands of the desert are gathering over its ruins, Venice is rising from the waters, the new entrepôt of commerce between the east and west.

A new route is discovered, by which the products of the agriculture and arts of India are conveyed to Europe; commerce departs with prosperity in her train, and Venice is given over to the destroyer.

In the early periods of history these changes were few, their progress was gradual, like the slow changes of the scenes of a diorama: ages elapsed before the tide ceased to set through Palmyra. In modern times the changes are like those of the kaleidoscope, sudden and striking. Agriculture changes its objects or its methods — manufactures spring up and flourish, or decay — the arts find new seats and new subjects for their exercise — commerce, which connects the producer and the consumer, runs in new channels. Cities greater than Tadmor or Venice spring up, the creations of a new civilization.

Increased production, whether in agriculture or manufactures, is so obvious and powerful a source of prosperity to a country, that we naturally look with interest upon every circumstance which may affect it, endeavouring as far as may be to understand, that we may aid. While all are agreed as to the necessity for cherishing agriculture, manufactures, the mechanic arts, and commerce, as the essential elements of national wealth, few agree as to the means of protection. One would think that by this time facts enough had been accumulated to settle all doubts, and to establish a science whose principles should be as well ascertained as those of the philosophy of nature. But the passions, prejudices, and interests of men must be overcome before they desire to find the truth; and then all the difficulties remain of interpreting the results of complex experiments, and of assigning the just influence to each of their numerous and varied attendant circumstances.

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It is conceded, in every civilised community, that the products of its agriculture, manufactures, and arts, should be brought as nearly as possible to perfection, and that improvement is the necessary consequence of the increased intelligence of those who follow the various callings connected with them. Avoiding, then, debated and debateable ground, and planting ourselves upon that which is fully and fairly our own, it may be profitable for us to consider *the means employed in different countries for the promotion of manufactures and the mechanic arts, and of the intellectual improvement of their cultivators.*

From this general survey we may derive materials for a comparative estimate of our own efforts — encouragement it may be, or stimulus to increased exertion; hints of new lines of usefulness, or assurance that perseverance in those in which our efforts are already directed will ultimately be crowned with success. In a country like this, where public opinion makes, alters, or repeals the laws, there is always reason to hope for the success of what is right. It may not come this moment, nor the next; but, as sure as the darkness of night heralds the approach of dawn, which certifies the coming noonday, so surely will truth finally prevail where public opinion rules.

The principle of voluntary association, by which, in the United States, we obtain some of our best results, is derived from the country to which we owe our origin. It is imperfectly understood on the continent of Europe, and is but feebly applied even in those countries where a semblance of political freedom exists. The government, too, often assumes the power to direct the mind and to control the will.

Prussia has undertaken to show what an "enlightened despotism" may effect; and the results of her combined, educational, military, political, and religious system yet remain to be fully developed. The rulers have had their preferences in regard to the encouragement of different departments of agriculture and the arts. At one time, the silk culture, and the manufacture of silk and porcelain, were especially patronised; at another, brass and iron founding, and the culture of the beet, and the manufacture of sugar from it. The minutiæ to which the government descends may be perceived from the fact, that licences to follow trades and occupations, the results of which concern human life (as those of the druggist and chemist, of the architect and builder, of the mason and carpenter, and even of the well-digger), can only be had upon an examination upon certain preliminary acquisitions, deemed essential to the prosecution of each.

The recommendation of general measures for promoting the interests of the useful arts is entrusted to a technical commission connected with one of the departments of the government. A society is also permitted in Berlin, which takes cognisance of inventions submitted to it, which meets at stated times to discuss reports upon alleged inventions or improvements, and under the nominal patronage of which a monthly journal is published. To provide for the technical instruction of those who intend to follow mechanical employments, schools have been established in many of the provinces, to be entered after the usual period of elementary instruction is passed, and before an apprenticeship is commenced, or during its first years. The most promising pupils of these schools are transferred, after serving a portion of the time of their apprenticeship, to a central school at Berlin, where they receive, free of expense, instruction in the branches which may fit them for the occupation of machinists, founders, and the like. Architects, builders, and engineers have a similar public institution, for the preparation of the members of their professions. The Trade Institute of Berlin turns out annually a class of well-educated young men, whose influence on the occupations which they embrace must ultimately be of the highest benefit.

The plan and execution of that great scheme of uniting the States of Germany, once loosely connected by political ties, in a commercial league, is due to Prussia; and now the toll-league embraces nearly all the states of the old German empire, except Austria. A uniform scale of duties is adopted by all, and import duties are collected at the frontiers, to be distributed in proportions agreed upon by the several parties.

Austria has *her* way of encouraging manufactures and the mechanic arts, different from that of Prussia. Her manufactures of porcelain, of iron, of linen, of sugar, and of chemical products, have in turn been aided. Her quicksilver mines and porcelain manufactory belong to the government, and the former are worked by a corps specially organised for the purpose. The government has established trade schools, like those of Berlin, in some of the provinces, but their great *Polytechnic Institution* is in the capital itself. No expense has been spared to collect in this establishment the best specimens of the materials used in the arts, of the tools and machines (or models of them) employed in the different manufactures, and of the products of industry. All are used for the purposes of instruction in the technical schools, and are accessible to the mechanic. One portion of the immense structure is occupied by the rooms devoted to these collections, and to models of architecture of various kinds, and of different countries. In one of them is a model of that admirable structure, now lost to us, the work of an American mechanic, the wooden bridge at Fairmount; and it would be curious if, one day, a Philadelphian should bring back a copy of it, to place in the hall of the Franklin Institute of Pennsylvania.

The late emperor, when heir apparent, vieing with that department of the government which had charge of the polytechnic school, collected for himself a vast museum of materials and products of the arts, pre-

senting not only the results of Austria, but of the world — a standing exhibition of the works of the useful and decorative arts.

The stranger must be struck with the magnificence of the pile thus reared by imperial munificence as the temple of the useful arts; and as entering the spacious gates, he passes through the halls devoted to elementary instruction in science and languages, to the higher branches of practical science, through the laboratories, only rivalled by one among ourselves, through the extensive range of rooms for the display of materials of the arts, of models, of fabrics, of machines — through the workshop, whence some of the most accurate instruments have proceeded — through the immense galleries, devoted to a standing exhibition of the arts, manufactures, and agriculture of Austria — he cannot but admit that in *this* at least the government has wisely appropriated the means derived from the people for the people's good.

It is admitted by all, that in the arts depending upon chemistry, the existence of that institution has already produced important effects; and it is generally believed that the view there afforded of the comparative essays of different manufactures has led to the improvement which the products of Austrian industry have exhibited at the German fairs.

Whether practical instruction in the workshop should precede or follow the theoretical instruction of the schools, is a moot point. An intelligent iron-master of Styria thought he had found the true solution to the problem, by bringing up his sons, from the time of finishing their elementary education at the forge and furnace, and at the end of their apprenticeship sending them to the technical schools. On the contrary, the Prussian educates for the workshop in the school, requiring each pupil to go through a course of practice there; and in Dresden, the apprentices who are pupils of the Saxon Trade School work during a part of the day, and receive their technical instruction during the remainder, thus mixing theory with practice.

We may admire the efforts of the Austrian and Prussian commissions, but, after all, the plodding spirit of routine which clogs the limbs of activity in these countries renders the measure of success of the plans *there* no scale to judge of what would be accomplished where the load of despotism was not to be borne forward.

France has halted in her scientific career since the youth of the nation have drunk so deeply of the excitements of political life. In Paris, the periodical exhibitions of the manufactures of the kingdom are, doubtless, not without their influence. The Conservatory of Arts and Trades — a fine array of models and machines — chronicles the various improvements in each branch of art. The lectures of its eminent professors spread before the student the scientific principles which he is to use. A few members in the National Institute give a representation to the arts. But these are acquisitions of a past day. The trifling public aid extended to the School of Arts and Trades in Paris — the stationary condition of the Sevres porcelain factory — the diminished glory of the Gbobelins — the attacks in the Chamber of Deputies upon the Industrial School of Chalons — do not speak of progress in the old way of government support, and no new one has come into operation to replace it.

It would be easier to generalise in regard to the United States, extending, as it does, through twenty-six degrees of latitude and eighty-three of longitude, than in relation to the small territory of Great Britain. If an Englishman's house is his castle, his workshop is its citadel. The establishment of Bolton and Watt is not open even to strangers, and strangers may pass into many not accessible to townsmen. Keen competition keeps men much asunder.

The Manchester man would care little for an exhibition which would bring to his town the iron of Glasgow, or the cutlery of Sheffield. Besides, neither his customers nor his judges are to be found at home. Rodgers displays his cutlery in his shop, because all great manufacturers have a show room; but he looks to America for his gains, and his agent in London occupies a small shop in an obscure street. Tennant cares little whether the colours of his dyes suit the "Glasgow folk" or the "Edinburgh gentry," or not; and Strutt does not make his woollens for the consumption of Derby.

The home market is comparatively of little importance. Every man endeavours to improve as fast as he can — to surpass his neighbour — to keep, as far as he can, the ascendancy which skill, or talent, or capital may have given him. The attempt of the British Association at Newcastle to bring together the products of the arts and manufactures, was but very partially successful, and it was thought that if this had been made by practical instead of scientific men, it would have failed entirely.

Are we to infer from this, that exhibitions and collections in the arts, and the diffusion of knowledge in regard to them are all useless? England is the workshop of the world. To what purpose do we toil to promote that which can and will take care of itself? Let us examine this argument a little. Are we sure that things might not be better under a different system, even in England? Who shall say what progress the English manufacturers and mechanics might have made, had their energy been aided by greater publicity — by greater facilities for comparison? One thing may positively be affirmed, that no patriot would exchange the neglect of education on the part of many of their opulent mechanics and manufacturers, of self-improvement out of the immediate line of the workshop, of good manners and address, for the strikingly reverse trait which obtains among so many of our men of equal resources in the arts. Education make a mechanic! says the objector. Watt was educated a surveyor — Arkwright a barber

—and yet the one was the great inventor of the useful form of the steam-engine, and the other of the jenny. What use of schools for special instruction in mechanics? This objection might, perhaps, have some force, if all men were Watts and Arkwrights, if there were no *common* minds to train. It would have more force if there were no education but to make certain forms of letters, and to construct sentences, and to add numbers. Away with such limited views of education! Were Watt's powers of observation and reflection not educated? Were Arkwright's powers of invention not educated? Their lives show how *the circumstances in which they were placed educated* them for their very inventions.

But if this argument is worth anything, it is worth carrying to its full consequence Because Burritt was brought up a blacksmith, Lukens a farmer, Baldwin a jeweller, Merrick a merchant, and Morris a druggist, we should make linguists by putting our sons to the anvil, mechanicians by requiring them to follow the plough, builders of locomotives and steam engines, and machine makers, by apprenticing them to the details of filagree work, of accounts, or of pharmacy. This seems the legitimate inference from the argument of those who because English manufacturers and mechanics are great in their lines, would eschew schools, lectures, cabinets, and exhibitions. Ask the men themselves whom I have referred to, how *they* would desire to educate *their* sons? how they would wish to have been educated, were their lives to be passed over again. Hear from them the difficulties which they have encountered for want of a different schooling. Hear from them the circumstances which have really given them their schooling. The school of life and practice is one of the hardest in which men are educated. Men who are educated in it are planting in growing time, and may be considered happy indeed if they reap before winter.

But have no attempts been made in Britain to improve the mechanic as an intellectual being? Professor Anderson of the Glasgow University, dissatisfied with the narrow regulations which constrained the institution to which he belonged, left by will his apparatus and a small legacy to found a more liberal school. Dr. Birkbeck endeavoured to make this small foundation available for the instruction of mechanics, and classes were opened for their benefit in the institution. Voluntary associations of mechanics, under various titles, sprang up under the direction of Birkbeck and his associates, and for a time promised great things in the culture of both the adult and the youthful mind. They usually combined public lectures in chemical, mechanical, and general science, and classes of mathematics, of English, modern languages, &c. for the sons, wards, and apprentices of members. Many of them are still in existence. Some have taken root, but are found to be supported more generally by merchants of various grades than by mechanics. From the example of these associations, others for very popular instruction have been established, giving lectures at moderate rates on geography, history, and the elements of natural science.

Some of the institutions for the promotion of the arts award prizes for special excellence in particular objects, to manufacturers and mechanics, and also to the successful pupils of their schools. The Society of Arts of London and that of Scotland, give premiums for meritorious inventions submitted to them; have papers read before them, by members, on new inventions, and the former association publishes its transactions. Each has a meeting for the public award of premiums. The Royal Institution of London, at its Friday evening meetings, calls frequently on mechanics for lectures *, explaining their arts and trades, and the improvements in them. These and similar efforts contribute to diffuse and to increase knowledge. If the results seem to be small, lost in the great stream of improvement which ever flows onward; yet in mingling with it, they impart at least some small motion to its mighty mass. The collision of mind with mind that takes place in these numerous associations, is of high importance; the tendency is to make men aware of their own deficiencies and to furnish a motive to supply them, to liberalise the feelings, to promote mutual confidence, and to produce *esprit de corps*. These results are of inestimable value in the aggregate.

Which of all these plans, devised by the intelligence of so many minds, for the *improvement of the useful arts, and of their cultivators*, have we followed out? What new paths have we opened? What success has attended our exertions? Voluntary associations for the improvement of agriculture, manufactures, and the arts, exist all over our country — not supported, it is true, by our great sovereign, the people, but by a few who are either immediately or remotely interested, or who desire to advance the weal of their country. If the eyes of this most august sovereign could but be opened to the importance of fostering these institutions! If for the improvement of the mass, he would but contribute a little of what he lavishes in raising up the political princes of the land! In the olden time, the Commons of England gave every ninth sheep and every ninth fleece to their ruler, to enable him to wage war; now a large portion of *our* commons devote at least the ninth penny to King Party, to enable him to carry on the strife political — would that they would spare the ninth part of this to put down ignorance and elevate virtue!

* The London reader will stare at this. Some person has been hoaxing the American Professor. — Ed. M. Alm.

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BUILDING STONES.

In 1838 Commissioners were appointed by government to inquire into the sorts of stone most proper to be used in the building of the New Houses of Parliament. The Commissioners were Charles Barry, Esq., Sir H. T. de la Beche, F. R. S. and F. G. S., William Smith, Esq., D. C. L., and Mr. C. H. Smith, who made a tour of inspection in order to examine not only the quarries, but also numerous public buildings. This inquiry was not extended to granites, porphyries, and the like, on account of the enormous expense of using them in decorated edifices, and from a conviction that an equally durable and in other respects more eligible material could be obtained among the limestones or sandstones of the kingdom. Several specimens of granite, however, were received, and especially from the vicinity of Oban in the west of Scotland, the property of the Marquis of Bredalbane, who munificently offered to the nation a free gift of his interest in any quantity that might be required, if it should be considered fit, for the proposed New Houses of Parliament. The valuable services of Professors Daniel and Wheatstone, of King's College, London, were also employed in determining the physical and chemical properties of a large proportion of the specimens obtained. The Report of the Commissioners contains much valuable information on building stones, and results in a preference being given to limestones, on account of their more general uniformity of tint, their comparatively homogeneous structure, and the facility and economy of their conversion to building purposes. Of this class they especially prefer those which are most crystalline, and finally recommend the magnesian limestone, or dolomite of Bolsover Moor and its neighbourhood, as the most fit and proper stone to be employed in the New Houses of Parliament. This selection was based upon its durability, as evinced by the sharp and clear mouldings, and even the chisel marks in parts of Southwell Church, built in the tenth and twelfth centuries, and upon the result of experiments which are detailed in Tables accompanying the Report. The specimens collected by the Commissioners consist of 6-inch cubes 197 in number. They were directed by the lords of the treasury to be placed in that admirable institution, the Museum of Economic Geology, Charing Cross, which is open gratuitously to the public every day in the year except Sundays, Good Friday, and Christmas Day.* This collection furnishes the most valuable and instructive lesson in practical building that this country has ever furnished. The specimens are enclosed in glass cases, each compartment containing from twenty-seven to thirty of them, with explanatory labels attached, showing the designation of the stone, the locality whence obtained, and the names of public buildings in which it has been employed.

The Bolsover stone, to which the Commissioners have given the preference, is obtained on a moor of that name in Derbyshire. It is very generally sawn into slabs for paving, &c. (the name of the nearest post town of the owner and his agent, and the name and address of quarryman, are given in every instance). Its mineral designation is magnesian limestone; its component parts are chiefly carbonate of lime and carbonate of magnesia, semi-crystalline, its colour light yellow. A cubic foot of it weighs 151 lb. 11 oz. It lies in numerous beds from 8 inches to 2 feet thick, to the thickness or depth of 12 feet of workable stone. Blocks of 56 cubic feet may be obtained, and the price of block stone at the quarry is 10*d.* per cubic foot. (The cost prices enumerated by the Commissioners were furnished to them by the several parties interested, without reference to a large supply, which would doubtless occasion new and more economical arrangements to be made.) The mode and cost of conveyance to London is described in each instance, and in the present one amounts to 16*s.* per ton. The cost of stone delivered in London is 2*s.* per cubic foot. The cost of plain rubble work per superficial foot is the same as that of Portland stone in London. The chemical analysis is as follows: —

Silica - -	3·6
Carbonate of lime -	51·1
Carbonate of magnesia	40·2
Iron and alumina -	1·8
Water and loss -	3·3
	100·

The specific gravity of a dry mass of this stone is 2·516, and of particles 2·833. The weight in the ordinary state of a cube of two inch sides, 4890·8 grains. The weight of the same, when well dried, 4881·4 grains. Weight, when saturated with water, 5042 grains, being an absorption of 160·6 grains of water. the proportion in bulk of which, as compared with the bulk of a two-inch sided cube, or eight cubic inches for unity, is ·079. (One specimen of magnesian limestone, from Cadeby near Doncaster, absorbed one fourth of its bulk.) The weight of particles disintegrated, after the two-inch sided cube had been subjected to Brard's process for eight days, was one and a half grain. The details of this process are described in vol. xxxviii. of the "*Annales de Chimie et de Physique*," and it is considered to represent very closely the action of the atmosphere during successive winters. The cohesive strength of the stone, or resistance to pressure, was ascertained by means of a hydrostatic press, and is given in one of the Tables, with an explanation of the data on which the experiments were founded.

* An excellent account of the contents of this establishment has been published by Mr. T. Sopwith, F. G. S. Price 1*s.*

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LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED UNDER 6 & 7 VICT. c. 65. (See preceding page 25.)

Date of Registration. 1842.	No. in the Register.	Registered Proprietors' Names.	Address.	Subject of Designs.
Sept. 1	1	Jonathan Murcott	Long Acre, London	Carriage lamp.
2	2	Thomas Evered Poole	Nether Stowey, Somerset	Snaffle curb.
5	3	Richard Clyburn	Uley Iron Works, Glouc.	Screw wrench or spanner.
6	4	Frederick Henry West	East. Counties Railway, Shoreditch	Heel-tip.
—	5	William Pawley	22. Red Lion Street, Clerkenwell	Eye-glass.
7	6	Thomas Penn	Bromsgrove St. Birming.	Dovetail sash fastening.
8	7	James Bullough	Blackburn	Weft distender.
—	8	C. Topham & E. Alderson Fawcett	Derby	Lady's mits.
9	9	Robert Wilkins	24. Long Acre	Ball cock.
11	10	John Clark	Little Albany St. North, Regent's Park	Light reflector.
13	11	Thomas Cook	22. Caroline St. Birming.	Save all, or candle spring.
—	12	James Horne	Clapham Common	Pencil case.
16	13	William Wilson	King Street, Manchester	Shower bath.
—	14	William Llewellyn	7. John Street, Bristol	Metal template.
19	15	John Chapman	81. York Pl. Waterloo Rd	Thongs to whips.
20	16	T. Childs	11. Green St. Leicester Sq.	Wax night light.
—	17	John Hotchings	Bath	Boot and shoe sole.
25	18	Alex. Horatio Simpson	11. Margaret St. Westm.	Pneumatic life-preserver.
27	19	Paul Moore	Birmingham	Stop butt hinge.
28	20	Wimble and Warner	Lewes	Churn.
—	21	James Stewart	Gloucester Cr. Regent's Park	Scroll fastener for brooches.
30	22	Insole and Jones	Hurst St. Birmingham	Clog fastening.
Oct. 2	23	Jno. G. Rowley	108. Hatton Garden	Self-binder or utilityclasp
3	24	Merry and Co.	Birmingham	Letter clip.
—	25	Wm. Henry Cherry	Northampton	Water closet.
—	26	Thomas Warne	Henrietta St. Cov. Gar.	Antigropelos.
4	27	Henry Curson	Kidderminster	Horse-power machine.
6	28	John Mather	Nine Elms, Vauxhall	Toepiece for boot and shoe lasts.
10	29	George Jones	Lionel St. Foundry, Birmingham	Exhauster, or blower of gas and air.
—	30	Henry Powell	102. New Bond Street	New nightcap.
12	31	Edmund G. Hummel	St. James Street, London	Air-tight bed and chamber pan.
—	32	Charles Lewis and Co.	Stangate Street, Lambeth	Omnidirect.shower-bath.
—	33	C. Topham and E. A. Fawcett	Derby	Glove, with cuff attached.
14	34	John Johnson	30. London Wall, City	Churn.
16	35	Joseph B. Shires	Newton St. Manchester	Iron shoe or tip
—	36	James Heath	Broad Street, Bath	New head or hood of a Bath wheel chair.
—	37	Daniel Ferguson	Kilkenny	Propelling apparatus.
17	38	George Stubs	Warrington, Lancaster	Window blind or roller map tackle.
18	39	William Healy	130. Fleet Street, London	Boiler in case.
20	40	George Orpwood	82. Bishopsgate St. City	Coffee roaster.
—	41	John M. Rumbley	Monkwearmouth, Sund.	Windlass.
21	42	J. Ward & W. Colbourn	Stratford-upon-Avon	Guillotine chaff-cutting-engine.
23	43	James Richmond	Salford	Machine for cutting hay and straw.
24	44	Benjamin Lisle	Church Street, Chelsea	Work-frame for Berlin and other descriptions of figure work.
—	45	William Cook	Redeross Street	Cock or tap for baths and washing tables.
25	46	Messrs. Perry	New Bond Street	Ring lamp.
—	47	Joseph Taylor	Pentonville	Fire escape.

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TABLE OF THE LONGEVITY OF THE INHABITANTS OF THE DIFFERENT DIVISIONS OF GREAT BRITAIN.

(*Compiled from the Population Returns of* 1841.)

Great Britain.	No. of Persons under 10 Years of Age.	Between 10 and 20.	Between 20 and 30.	Between 30 and 40.	Between 40 and 50.	Between 50 and 60.	Between 60 and 70	Between 70 and 80.	Between 80 and 90.	Between 90 and 100.	100 and upwards.	Age not specified.	Total of Males.
MALES.													
England - - -	1,875,707	1,550,129	1,257,068	933,769	703,928	464,531	307,526	148,760	37,675	2,678	72	33,876	7,294,649
Wales - - -	117,098	97,151	75,554	54,503	39,790	29,168	20,158	10,054	3,561	294	10	1,551	447,145
Scotland - - -	352,506	278,575	204,715	149,799	112,450	75,179	50,797	24,874	7,468	751	45	3,491	1,238,669
Islands in the British Seas -	15,157	11,970	8,751	7,029	5,801	4,025	2,671	1,273	309	20	- -	22	57,004
Army* - - -	- -	6,666	17,873	9,616	2,145	328	117	13	- -	- -	- -	85,217	122,505
Navy — marines and seamen in registered vessels† - -	192	17,627	47,653	17,571	7,136	1,955	308	19	1	- -	- -	5,791	98,254
Persons ascertained to have been travelling by canals and railways on the night of the 6th June, 1841	105	439	357	220	111	45	28	4	- -	- -	- -	2,820	4,130
Grand total, males‡ - -	2,558,745	1,962,558	1,590,869	1,172,597	871,677	574,069	381,905	184,999	48,805	3,726	127	152,481	9,262,126
Ratio - - - -	1 in $5\frac{9}{10}$	1 in $4\frac{7}{10}$	1 in $5\frac{8}{10}$	1 in $7\frac{9}{10}$	1 in 10	1 in $16\frac{1}{10}$	1 in $21\frac{2}{10}$	1 in 50	1 in $187\frac{7}{10}$	1 in $2,185\frac{5}{10}$	1 in 72,950		
FEMALES.													
England - - -	1,890,765	1,557,974	1,418,581	994,885	734,328	495,047	344,281	171,246	48,026	4,374	141	11,201	7,6 1,751
Wales - - -	116,016	96,129	78,054	55,159	42,076	32,581	24,695	12,962	5,065	586	26	271	465,896
Scotland - - -	323,796	288,018	251,244	178,969	151,715	90,587	64,881	32,446	10,821	1,094	59	1,662	1,378,322
Islands in the British Sea -	14,954	13,250	12,432	8,776	6,816	4,605	3,258	1,708	617	51	- -	27	66,484
Passengers and others on board Her Majesty's ships - -	151	112	301	197	132	41	11	- -	- -	- -	- -	18	969
Persons ascertained to have been travelling by canals and railways on the night of the 6th June, 1841	83	37	64	43	27	11	3	- -	- -	- -	- -	615	886
Grand total, females - -	2,345,766	1,995,800	1,763,682	1,238,007	915,154	623,775	437,110	218,362	64,527	6,105	226	13,794	9,582,508
Ratio - - - -	1 in 4	1 in $4\frac{7}{10}$	1 in $5\frac{3}{10}$	1 in $7\frac{7}{10}$	1 in $10\frac{4}{10}$	1 in $15\frac{3}{10}$	1 in $21\frac{9}{10}$	1 in $43\frac{8}{10}$	1 in $148\frac{4}{10}$	1 in $1,569\frac{7}{10}$	1 in 42,399		
Grand total of both sexes -	4,684,509	3,958,158	3,354,551	2,410,404	1,786,821	1,197,844	819,015	403,361	113,332	9,831	353	146,275	18,844,454

* The totals for the army include 74,454 men serving abroad, and 14,776 in Ireland.

† These totals include 28,643 marines and seamen belonging to the royal navy; and 68,156 registered seamen afloat; 1,016 convicts in hulks; and 439 passengers and others on board Her Majesty's ships; but are exclusive of seamen on shore at the time of the census, who were duly enumerated, and are included in the parishes in which they were respectively found.

‡ A return from the East India Company states that 17,992 men (Europeans) were employed in their service abroad; but as the number belonging to Great Britain were not distinguished, it has been deemed proper to exclude them altogether in this summary.

TABLE OF THE AREAS OF REGULAR POLYGONAL FIGURES.

Name.	No. of Sides.	Angle at the centre.	Area in inch. the side being unity.	Area in imperial gallons.	Area in imperial bushels.
		degrees.			
Trigon - - -	3	120	·4330127	·0015616	·0001952
Tetragon - - -	4	90	1·0000000	·0036065	·0004508
Pentagon - - -	5	72	1·7204774	·0062049	·0007756
Hexagon - - -	6	60	2·5980762	·0093701	·0011713
Heptagon - - -	7	$51\frac{3}{7}$	3·6339124	·0131058	·0016382
Octagon - - -	8	45	4·8284271	·0174139	·0021767
Nonagon - - -	9	40	6·1818242	·0222950	·0027869
Decagon - - -	10	36	7·6942088	·0277495	·0034687
Undecagan - - -	11	$32\frac{8}{11}$	9·3656411	·0337775	·0042222
Dodecagon - - -	12	30	11·1961524	·0403794	·0050474

TREATMENT OF WORKPEOPLE BY THEIR EMPLOYERS.

A Parliamentary Inquiry into the payment of wages in goods, has shown that there are persons extensively engaged in manufactures of various kinds, who feel that the employment of bodies of workpeople involves a degree of responsibility to care for their general well being, and who act on that conviction in a manner highly creditable to themselves, and conducive to the excellent object they have in view. They justly think that, to regard as a machine a man whose skill or industry assists them to maintain their own families in respectability, is altogether unchristian, and that by viewing workpeople in such a light, they would deprive themselves of some of the finest opportunities of usefulness, and of cementing the bonds of society.

The principal example of attention to the interests of workpeople which came under the notice of the Parliamentary committee, was that of Sir John Guest and Co., at their iron and coal works, Dowlais. These works, which were established from thirty to forty years since, "in an isolated place on the top of a hill," in Glamorganshire, have now a town around them (Merthyr Tidvil), and nearly 5000 persons are employed by this firm alone. In the first instance, great difficulty was experienced by the workpeople in procuring the means of lodging, but in the course of time, this was removed by the erection of a large number of cottages at the expense of the company, and by the people being encouraged to build dwellings for themselves. The cottages belonging to the firm are stated to be low rented, convenient, well-built, and well-drained, and the taking of them is quite optional with the workpeople; while the granting of loans to steady men to build cottages for themselves has been pursued to a considerable extent, and has been found to attach them to the place, to keep them from the ale house, and to produce and confirm in them a feeling of independence. The amount of each individual's wages at this extensive establishment is settled every Friday evening, and the whole of the hands are paid on the morning of Saturday; showing that a large number of workpeople is no barrier to the early payment of wages, if employers are determined to adopt that highly beneficial practice. Nearly twenty-four years ago, Sir John Guest and his partners recognised the responsibility which attached to them as employers by erecting large schools, near the works at Dowlais, chiefly for the education of the children of their workmen, but not confined to them. There are at present about 220 girls and 250 boys under instruction, the children being admitted at the age of six, and usually remaining until thirteen years old. The teachers are well paid, and the whole expenses of the schools are defrayed by the workpeople and employers together, in the following manner: — twopence in the pound is stopped every week "for the doctor" from the wages of every one in the works, of which $1\frac{1}{2}d.$ is appropriated to provide medical attendance for the families of the workmen, and the remainder goes towards the support of the schools. Each child is also expected to pay one penny a week, and whatever is wanting to make up the amount incurred in maintaining the educational establishments, is contributed by the company. In connection with the schools, it is worthy of notice that Mr. Evans, the manager at Dowlais (from whose evidence our facts are drawn), expressed before the Committee a strong conviction, as the result both of his own observation for above twenty years, and of the statements of colliers themselves, that for a collier to put his child to work in the pits very young, is decidedly bad economy; instead of gaining, the family loses by it in the long run, while the unfortunate victim of error or cupidity becomes decrepit and unfit for work when individuals of the same age are in the possession of mature strength. Very few of the children taught in the schools at Dowlais become colliers, the greater number being qualified for employment as

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carpenters, smiths, and, in some instances, even book-keepers. "We derive very great advantages," says Mr. Evans, from having children in the works who have been educated there; they are of great use to us. Here, then, is a proof to masters who have not yet exerted themselves for the elevation of the families dependent on them, but are disposed to do so, that such a course is not only beneficial to others, but brings a reward to every one who adopts it. The medical attendants on the workpeople at Dowlais consist of three regular surgeons and a dispenser, whose services are remunerated chiefly by the money stopped from the wages In 1827 a fund for the relief of the sick and aged was formed, one penny in the pound being stopped every week to furnish the necessary supply for the wants of those who are thus unable to provide for themselves: this fund is at the disposal of a committee, elected yearly by all the contributors.

From the peculiar circumstances of the district when the works of Sir John Guest and Co. were established, and for many years after, it was desirable and even needful that the firm should afford their workpeople the means of obtaining the necessaries of life by maintaining a shop on the premises. In 1823, however, they they closed it, but once again opened it at the request of the men in 1828. On the act against truck shops being passed in 1831, the workmen were called together and desired to state whether they wished the store belonging to the firm still to be continued. The votes were taken by ballot, and thirteen only were given for the discontinuance; but as there was not perfect unanimity, the company thought it best that the shop should be finally closed at that time; and the increase of population having had the usual effect of attracting private individuals to supply the wants of the community, the only result of this step was to shut up an establishment where the labouring classes were always sure of buying good articles at a moderate price. The accommodation being no longer necessary, we think the company's decision was a wise one.

It is gratifying to find that no loss whatever has been entailed on Sir John Guest and Co. by all the beneficial regulations adopted by them on behalf of their workpeople. On the contrary, "by the education of the people," Mr. Evans states, "we have gained more than we have spent upon them." And this gentleman expressed himself as feeling certain that if a similar system were extended over the manufacturing and mining districts of the whole country, it would prove the cheapest and most effectual mode of benefitting both the working classes and employers, and consequently society at large.

TABLE OF THE AVERAGE ANNUAL VALUE OF LAND, PER STATUTE ACRE, IN ENGLAND AND WALES.

England.	s.	d.
Bedford	22	0
Berks	19	10
Bucks	23	1
Cambridge	21	2
Chester	23	1
Cornwall	14	2
Cumberland	10	2
Derby	19	0
Devon	15	0
Dorset	17	1
Durham	14	7
Essex	20	9
Gloucester	22	3
Hereford	20	0
Hertford	19	1
Huntingdon	19	10
Kent	20	11
Lancaster	24	9
Leicester	20	9
Lincoln	21	1
Middlesex	33	9
Monmouth	15	9
Norfolk	18	8
Northampton	23	0
Northumberland	12	4
Nottingham	21	0
Oxford	21	10
Rutland	22	3
Salop	20	4
Somerset	25	10
Southampton	13	10
Stafford	23	9
Suffolk	18	9
Surrey	15	6
Sussex	13	0
Warwick	24	10
Westmoreland	9	0
Wilts	20	6
Worcester	26	2
York — East Riding, City, and Ainstey	19	8
North Riding	12	10
West Riding	17	7
Average of England	18	10
Wales.		
Anglesea	19	0
Brecon	7	1
Cardigan	6	8
Carmarthen	9	2
Carnavon	7	3
Denbigh	13	0
Flint	18	11
Glamorgan	8	11
Merioneth	4	8
Montgomery	9	3
Pembroke	11	4
Radnor	8	3
Average of Wales	9	5
Average of England and Wales	17	8

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TABLE OF ALL THE KINDS OF WOOD PAVEMENT HITHERTO LAID DOWN, OR IN COURSE OF BEING LAID DOWN, IN ENGLAND, THE PLACES WHERE LAID DOWN, THE QUANTITIES AND PRICES.

Name of Inventor and Date of Patents.	Date.	Localities where laid down.	No. of Super. Yards.	Price per Yard.
Stead,	1838	Oxford Street, London	250	
May 19. 1838, April 23. 1839	1839	Old Bailey	650	
		Berkeley Square	300	
	1840	Northumberland House	990	
		Sion House, Isleworth	983	
		Strand	900	
		Woolwich Dock-yard	800	
		Guy's Hospital	200	
		Lamb's Conduit Street	400	
		Foundling Hospital	100	
		Salford Crescent, Manchester	980	
	1841	Duncannon Street, Strand	1,100	
		Hunter Street	2,100	
		Greenwich Hospital	300	
		Piccadilly, Manchester	500	10*s.* 6*d.*
		Ditto	930	
		Leeds	800	
		Cook Street, Liverpool	120	
	1842	Pall Mall, Manchester	100	
		Manchester and Leeds Railway Company's Station, Oldham	120	
		Lower King Street, Manchester	487	
		Manchester and Leeds Railway Company's Station, Oldham	250	
		Strand	3,790	
		Grand Junction Railway Company's Station, Crewe	2,184	
		Lower King Street, Manchester	870	
Count de Lisle,	1839	Whitehall	1,093	
Metropolitan Wood Paving Company)	1840	Oxford Street	2,417	
June 27 1839.		Southampton Street	236	
		Berkely Square	57	
		Fore Street	521	
	1841	Coventry Street	1,509	
		Pimlico	72	
		Leadenhall Street	254	
		St. Paul's Church Yard	1,514	
		St. Andrew, Holborn	2,394	
		St. Giles's	2,050	
		Regent Street	2,844	
		Borough	409	
		St. Giles's, Holborn	1,904	
	1842	In Glasgow	983	12*s.* 6*d.*
		Hammersmith Bridge	1,502	
		St. Andrew, Holborn	4,031	
		Leadenhall Street	170	
		Jermyn Street	2,567	
		Old Bailey	982	
		Newgate Street	1,456	
		Piccadilly	1,107	
		Jermyn Street	500	
		Southampton Street	1,061	
		Lombard Street	1,147	
		Oxford Street	13 128	
		Regent Street	9,162	
		Bishopsgate Street	2,000	
Carey,		Poultry	150	
January 29. 1839		Mincing Lane	500	
		Lothbury	400	
		Cornhill	200	
		Gracechurch Street	150	
		Bartholomew Lane	400	
		Newgate Street, west end of	500	
		St. Clement Danes, Strand		12*s.* 6*d.*

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Name of Inventors, and Date of Patents.	Date	Localities where laid down.	No. of Super. Yards.	Price per Yard.
		Jermyn Street, St. James's, west end of		
		Opposite White Horse Cellar, Piccadilly		
		Free-school Street, Borough		
		Railway Terminus, London Bridge		
Grimman, April 15. 1840		Bishopsgate Street - -	2,306	
	1841	Opposite Ashburton House, Piccadilly	600	
	1842	Goods Sheds, Terminus of North Eastern Railway	850	11*s.* 6*d.*
		Warehouses of the Dover Railway Station, New Cross -	250	
Davies, August 8. 1840	1842	Lombard Street - -	284	?
Rankin, April 27. 1841	1842	Opposite St. Giles's Church -	532	18*s.* 0*d.*
		Cheapside, commencing at the Poultry	2,000	
Mortimer, November 16. 1841	1842	Fronting St. Martin's Church -	300	12*s.* 6*d.*
Perring, July 7. 1842	?	St. Paul's end of Cheapside -	3,000	12*s.* 0*d.*
Harlow, February 9. 1842	?	Large store-house at Woolwich	?	11*s.* 6*d.*
Sanders, August 3. 1840	?	Strand, opposite Somerset House	?	
Parkins, April 9. 1839	1842	High Street, Borough -	?	?
	1843	Dorset Street, Pall Mall -	?	
		Total -		

Many thousands of yards which have been laid down in private situations, as court-yards, stables, &c., are not included in the above list.

The total number of English patents taken out for wood paving since that of Mr. Stead, in May 1838, to the 1st November 1843, has been 36.

In America wood-paving has hitherto proved a failure, but owing, it is said, to the selection of very inferior sorts of wood for the purpose. In New York, Philadelphia, and Boston, where wood-paving has been extensively tried during the last five years, the authorities are now returning to the use of stone.

TABLE OF EVAPORATION,

Exhibiting the average Results of Thirty Experiments on the Effect of admitting Air into the Body of Steam-engine Boiler Furnaces, showing, that by an Admission of Air to the Extent required to prevent Smoke, much additional Heat is produced, more Steam raised from the same Weight of Coals, and more Water evaporated in the same Time.

Explanation.

In each experiment 1840 pounds' weight of coals were burnt, and the relative quantities of water evaporated shows the relative economic effect. Two kinds of coal were used — Knowles's Clifton coal, a free burning kind, which does not cake, and produces a considerable quantity of ashes; Barker and Evans's Oldham coal, a slow-burning, rich, caking coal, containing little ashes. The boiler is one of Boulton and Watt's, twenty-four horse-power, waggon shape.

The average heat given is that in the first flue, as ascertained by a pyrometer and deduced from pyrometric diagrams. The air was admitted partly at the door, and partly at the bridge; at the latter point through one of Mr. C.W. William's diffusion boxes, except in the last experiment with Clifton coal.

The experiments were not undertaken to determine the details of the best modes of admitting air, or the best construction of furnaces, or proportion between boiler and grate surface, but the effect of admitting air in greater or less quantity permanently or periodically, by a uniform or varying aperture; and the general result arrived at is, that by the simple and inexpensive plan of admitting air into the furnaces both at the door and the bridge by permanent apertures, always open, varying in aggregate area from one and a half to three square inches (according to the quality of the coals), for

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every square foot of area of grate, an important saving in fuel is effected, and nine-tenths of the dense smoke prevented, without any special attention or care of the fireman.—*Mr. H. Houldsworth's Evidence before Committee of the House of Commons on the Prevention of Smoke.*

TABLE.

Weight of Charge.	Air.	Effect per Minute. Coals burnt.	Effect per Minute. Water evaporated.	Water evaporated by 1,840 lbs. of Coal.	Water evaporated by 1 lb. of Coal.	Average Temperature in the first Flue.	Economic Effect.	
Clifton Coal:		*lbs.*	*galls.*	*galls.*	*lbs.*	*degrees.*		
460 lbs.	No air	4·64	2·5	992	5·41	973	106	
460 lbs.	45 square inch constant aperture	4·68	3·21	1263	6·85	1105	135	
230 lbs.	Air, regulated partly by the eye, and partly by a scale, varying in some degree with the action of combustion	4·43	3·09	1280	6·94	1122	136	
230 lbs.	45 square inches	4·65	3·05	1210	6·6	1020	129	
230 lbs.	No air	4·43	2·3	942	5·12	995	100	
460 lbs.	Air, through two pipes, six inches in diameter each, regulated by sight	4·65	3·15	1250	6·8	1160	133	Effect as furnaces are usually worked, being assumed 100.
Oldham Coal:								
230 lbs.	No air	3·67	2·65	1340	7·3	960	100	
230 lbs.	35 square inches constant aperture	4·05	2·76	1260	6·85	1080	94	
230 lbs.	24 square inches constant aperture	3·82	2·82	1360	7·4	1050	102	
460 lbs. and 230 lbs.	Air regulated by scale	3·84	2·94	1410	7·7	1070	106	
230 lbs.	Air, regulated by sight, so as to produce no smoke	3·61	2·87	1530	8·3	1053	114	
Half Oldham Half Clifton		4·05	2·9	1320	7·2	1060		

Deductions from the Experiments on Clifton Coal:

Gain in evaporation by regulated admission of air ..... 35 per cent
Ditto 45 square inches constant aperture ..... 34 per cent
Ditto charges of 460 lbs. instead of 230 lbs. ..... 4 per cent

Steam produced in a given Time:

No air ..... 230 lb. charges 100
No air ..... 460 lb. charges 109
53 square inches air, 230 lb. charges 132
Air regulated ..... 230 lb. charges 134
53 square inches .... 460 lb. charges 140

showing that the admission of air increases the production of steam in a given time from 30 to 40 per cent.

TABLE OF THE AVERAGE DURATION OF EMIGRANT VOYAGES.

	Weeks.
From England to the Eastern Coasts of North America	10
West Indies, the Bahama Islands, and British Guiana	10
Eastern Coasts of Central or South America	12
West Coast of Africa	12
Cape of Good Hope	15
Falkland Islands	15
Mauritius	18
Western Australia	20
New Australian Colonies	22
New Zealand	24

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ENGLAND THE METROPOLIS OF INVENTION.

England, beyond all other nations, is rich in machinery and inventions. Whatever is, or is thought to be, of value amongst the devices of ingenuity, or the results of scientific investigation, either originates here, or is soon made ours. We may search in vain for a richer spring of improvement than that which exists at home; and to whatever cause it may be ascribed, the foreign discoverer or inventor, if he attribute any value to his achievements, rarely thinks his fame or his profit duly secured, if they be not published in English periodicals, or protected by an English patent; and if perchance anything singular or effective has been left in obscurity, by the love of fame or profit, the curiosity of our countless travellers brings it into day. Here then, we are placed in the chief centre of observation; the accumulated devices of ages are at work under our eyes; ingenuity and research can add nothing to them which we may not instantly remark.

* * * * *

We are not to suppose invention has done all its work. We know not, indeed, what its next achievement will be; to know that, would be the next thing to accomplishing it. But let us ask, what reason have we to suppose that invention is now exhausted, which did not exist sixty or seventy years ago? That which was then thought impossible, is now done in the common course of daily business. The twelve million pounds worth of cotton-wool we now take annually of America, was as far from all prudent probability fifty years ago, as ten times that amount is for a period of twenty years to come; and it is a consumption caused entirely by improvements in machinery, which have brought down the price and usage of cotton fabrics, from the means and fashion of the wealthy few, to those of the poor and toiling many. Nor have we an art or manufacture of any importance, which remains as it was in the latter half of the last, or even in the beginning of the present century. And at this day, under our own eyes, are arising, not merely inventions, but new arts, of the extent of whose future consequences we can only say, but we may say with certainty, that they must be exceedingly great.

* * * * *

We have not long recovered from the surprise which seized us, when the skill and perseverance of our engineers and mechanists first brought about the recent splendid results of this kind. To bring the continent of America within a *certain* twelve days' sail from our shores, to make Liverpool but a ten hours' easy ride from London, to deliver letters in London before the end of the twenty-fourth hour after they were posted in Dublin, to reach Bombay in thirty days from Falmouth, and by modes of travelling which women and children may ordinarily use—these were the airy visions or broad jokes of times but just gone by; but are now our daily and unthought-of conveniences. All the lower modes of travelling have also partaken of the spirit of improvement; our sailing vessels emulate our steamers in dispatch and punctuality; and our turnpike roads and coaches, long before they were hopelessly defeated as main trunks by the railroads, had received every improvement which science could suggest, or impatient rapidity demand. It is impossible that the effects of these better modes of transit should be confined to the principal lines on which they immediately operate; if the rivalry of steam compels New York "liners" to "put the best leg foremost," the style in which they do it will soon be found to prevail on the voyages to Australia and New Zealand; and now that twenty or twenty-five miles an hour is ordinary work in England, the colonist, if he know it, is likely to be less content with almost unpassable tracks, than when the distance from Portsmouth to London was a three days' journey for royalty.

Here too, as in manufactures, the spirit of invention is still at work: it is not content with bridging the Atlantic, and running 3000 miles at a spell, in spite of formulæ and Dr. Lardner. There are at this hour inventions in existence, which rigid demonstration seems to say will bring steam-voyages of 4000 or 5000 miles as much, at least, within our power as are the present performances, and at a cost proportionately reduced. We say nothing of still more startling announcements, even that, before long, Calcutta will be as to time as near London as Edinburgh was less than a century ago? and yet the talent and standing of the parties who say they hope to accomplish this, may go for something against the inherent, or rather the present, improbability of such a consummation. We mention not these matters to draw present faith to them, but to show that after all which has been done, men's brains are busy about modes of locomotion: and except we can bring ourselves to believe that nature's secrets are all extorted, and her treasures all ransacked, we must conclude that this untiring scrutiny will bring out something, probably much, that even in this *flying* age we have not yet known.

We are already feeling the influence of more frequent intercourse with Canada and the United States; we are beginning to feel that of our improved transit to India. Scenes which a few years ago seemed to belong to a kind of fairy-land, beyond the range of every-day imagination, are now almost the staple of our familiar and daily talk; and undertakings which seemed beyond the bounds of prudent enterprise and ordinary means, have become matters

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of common business and jog-trot application. Much less ado is now made of a voyage to America than formerly of one to Ireland; and to go to India is an affair as little formidable as, since the peace of Paris, it was to travel to the south of France. A Bengal Zemindar comes to England from curiosity, and finding, after a while, he has to attend to some affairs at home, he sets off in November, leaving word at his hotel in London he shall be back again in May. Now let us remember, that all the world over, the main rule of human action is *neighbour-measure;* let us take into account that the measure, moral and intellectual, of that neighbour will be oftenest and most nearly conformed to, whose wealth and power add most force to his example, and the impress of whose doings is most frequently repeated; let us be thankful, that in its wisdom and goodness, Providence has given the greatest amount of these inferior and adventitious influences along with, and evidently for the help of, that example which, with all its faults, is at present the best the world can afford; and let us conclude from all, that the more perfect and rapid are our means of conveyance, the lighter and more economical of fuel our marine-engines, the safer and more sea-defying our steam-boats, the more frequent will be our intercourse with those portions of the human race which are behind us in knowledge and civilisation, the more influential for good will be the fame of our strength and standing, the more impressive will be our example in manners, in morals, and in righteousness, and the more extended and successful will be our direct attempts to establish the dominion of truth and peace. — *Fisher's Colonial Magazine.*

METHOD OF REGISTERING THE FORCE ACTUALLY TRANSMITTED THROUGH A DRIVING BELT.

BY PROFESSOR SANG, OF THE MANCHESTER COLLEGE.

It is a desideratum to have the means of ascertaining how much force is actually consumed in the working of a machine. Whenever the motion is communicated by the intervention of a belt, or band, this can be very easily accomplished.

When we see a belt passed over two pulleys, and look without any narrow examination at the motion, we regard the action as a very simple one; there is more in it, however, than appears at first sight. For the sake of clearness, let us call the driving pulley the drum, and the other the pulley. The belt passed over them, whether plain or crossed, has two free parts, one of which *draws*, and the other *follows*. If it were possible that no force were needed to turn the pulley, these two free parts would be in the same state of tension; but whenever any resistance is made to the motion of the pulley, the drawing part is distended more, and the following part less, than usual; and experiments show that, within all practical limits, *this change is exactly proportional to the pressure necessary for overcoming the resistance.*

As the movement proceeds, the distended part of the belt is lapped over the drum, and, so to speak, the contracted part is lapped over the pulley, so that the circumference of the drum moves more swiftly than that of the pulley; thus, if the distension be 1 in 100, for 100 inches of the drum there would only be 99 inches of the pulley passed over.

The difference between the velocity of the drum and that of the pulley, thus indicates the pressure needed to carry the drum round. Now this pressure, combined with the distance through which it acts, gives the force used; and hence the simple difference between the distances passed over by the circumference of the drum, and by that of the pulley, is exactly proportional to the force; *and we have only to contrive some method of registering this difference, in order to have a record of the total force transmitted by the belt.*

There may easily be contrived a variety of arrangements for showing the difference between the motions of the drum and pulley. Thus a pair of indicators may be fitted, one to each shaft, so as to tell the total number of turns made by each; from this number, by help of the measured diameter, the distance passed over by each circumference can be found, and thus the element for knowing the force transmitted can be had.

Or otherwise, and this, perhaps, is the most convenient arrangement, a light pulley, having its circumference one foot, may be brought to bear against the belt on the drum, and another against the belt on the pulley; if these light pulleys have counting gear attached, a simple reading off and subtraction will give the difference of distance.

Having now ascertained the difference between the motions of the drum and pulley, it remains to ascertain by what this must be multiplied, in order to give the force. It is not my object, at present, to enter into the theory of the matter — although this theory presents several points of considerable interest, but to give a practical application of the principle. In order to find out the force due to a single foot of difference, we have to run the pulley unburdened for a considerable time, taking notice of the difference of motion, and then loading the shaft by means of a spring friction-strap with two arms, repeat the observation over as many strokes of the engine, or turns of the drum: in this way we shall have a new difference, and subtracting the one from the other, we shall

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have what is due to the force as shown by the friction strap.

When the multiplier for one belt has been ascertained, that for any other belt may be approximately computed, if it be of the same material, by having regard to the relative weights of a foot of each; so that a pair of accurately constructed counters form a portable apparatus, by means of which the force transmitted by any belt may at once be ascertained, the weight, length, and material of that belt being known.

SIMPLE AND CONCISE METHOD OF COMPUTING (WITHIN ONE HALF-PENNY) A HALF YEAR'S DIVIDEND ON ANY AMOUNT OF STOCK IN THE PUBLIC FUNDS, &c.

BY MR. J. STERLAND.

Rule. — Multiply the *stock* by the rate per cent. Take the unit of the pounds for the *pence*, and the figures on the left hand of it for the *shillings*.

Thus, the half year's dividend on 281*l.* 1*s* 2*d*. in the 3 per cents., which being multiplied by 3 makes 843*l.* 3*s.* 6*d.*, is 84*s.* 3*d.*, or 4*l.* 4*s.* 3*d.*

But when this *unit* is more than 4, and when the *shillings* are more than 5, then *one penny* must be added to the result for each unit and fraction.

Thus, on 281*l.* 13*s.* 4*d.*, which being multiplied by 3 makes 845*l.*, is 84*s.* 5*d.*, or 4*l.* 4*s.* 5*d.* Add 1*d.* for the *unit*, being more than 4, and it is then 4*l* 4*s.* 6*d.*

On 281*l.* 1*s.* 2*d.* in the $3\frac{1}{2}$ per cents., which being multiplied by $3\frac{1}{2}$ makes 983*l.* 14*s.* 1*d*, is 98*s.* 3*d.*, or 4*l.* 18*s.* 3*d.* Add 1*d.* for the *shillings* being more than 5, and it is 4*l.* 18*s.* 4*d.*

On 281*l.* 18*s.* 2*d.*, which being multiplied by $3\frac{1}{2}$ makes 986*l.* 13*s* 7*d.*, is 98*s.* 6*d.*, or 4*l.* 18*s.* 6*d.* Add 1*d.* for the *unit* being more than 4, and 1*d.* for the *shillings* being more than 5, and it is then 4*l.* 18*s.* 8*d.*

This method may be considered sufficiently accurate for the general purposes of the public; but it cannot be adopted by the clerks in the Bank of England, because Government never pay the smallest fraction *more* (although they frequently pay *less*) than the *true* computation.

The annual dividend paid half yearly at the Bank on 5*s.* 7*d.* stock in the 3 per cents., is *two pence*, but on 5*s.* 6*d.* stock no dividend at all is paid. The Bank pay the same half yearly dividend on 287*l.* 15*s.* 6*d.*, as on 287*l.* 10*s.*, viz. 4*l.* 6*s.* 3*d.*

TABLE OF THE LINEAR EXPANSIBILITY OF DIFFERENT METALS BY HEAT.

The length of a bar of each metal is supposed to be at 32° Fahr., 1·000,000. The Table shows the degree to which it will expand, if the heat is raised from 32° to 212°, the boiling point.

Platinum	1·00091085	or one	1097th part.
Palladium	1·00100000	—	1000th —
Antimony	1·00108300	—	923d —
Cast Iron	1·00111025	—	901st —
Steel	1·00121286	—	824th —
Wrought Iron	1·00124860	—	801st —
Bismuth	1·00130200	—	718th —
Gold	1·00149824	—	667th —
Copper	1.00179633	—	557th —
Gun Metal (C. S. T. 1.)	1·00181700	—	550th —
Brass	1·00190663	—	524th —
Speculum Metal	1·00193300	—	517th —
Silver	1·00200183	—	499th —
Tin	1·00235840	—	424th —
Lead	1·00285768	—	350th —
Zinc	1·00297650	—	336th —

The above are the mean proportions of the various examples of each metal, given in Dr. Ure's Dictionary of Chemistry, and elsewhere.

TABLE OF THE HEAT CONDUCTING POWER OF DIFFERENT SUBSTANCES.

	Conducting Power.
Gold	100
Platinum	98·1
Silver	97·3
Copper	89·82
Iron	37·41
Zinc	36·37
Tin	30 38
Lead	17 96
Marble	2·34
Porcelain	1·22
Brick earth	1·13

TABLE OF THE TENACITY OF WIRES 0·787 OF A LINE DIAM.

	lbs.
Iron	549
Copper	302
Platina	274
Silver	187
Gold	150

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SHORT AND SIMPLE METHOD OF CALCULATING COMMISSION, BROKERAGE, INTEREST, DISCOUNT, &c.

BY MR. J. STERLAND.

Rule. — Multiply the given number of pounds by twice the rate per cent. Take the unit for the pence, and the remaining figures are the shillings.

Thus, the commission, &c. on 83*l.* at 2 per cent., is found by multiplying 83 by 4, which makes 332, that is, 33*s.* 2*d.*, or 1*l.* 13*s.* 2*d.*

But when the unit is more than 4, and when the shillings produced by the multiplication are more than 5, then one penny must be added to the result for each unit and fraction.

Thus, for the commission, &c. on 58*l* at 6¼ per cent., multiply 58 by 12½, which makes 725. Add 1 for the unit being more than 4, and it is then 726, that is, 72*s.* 6*d.*, or 3*l.* 12*s.* 6*d.*

For the commission, &c. on 125*l.* at 3⅜ per cent., multiply 125 by 6¾, which makes 843*l.* 15*s.* Add 1 for the shillings being more than 5, and it is then 844, that is, 84*s.* 4*d.*, or 4*l.* 4*s.* 4*d.*

For the commission, &c. on 134 at 5⅝ per cent., multiply 134 by 11¼, which makes 1507*l.* 10*s.* Add 1 for the unit being more than 4, and 1 for the shillings being more than 5, it is then 1509, that is, 150*s.* 9*d.*, or 7*l.* 10*s.* 9*d.*

Half, or 10*s.* per cent., is found at sight, *instanter*. By adding one penny when the unit is more than 4, the given sum shows its own commission, &c., thus, on 164*l.* it is 16*s.* 4*d.*, and on 165*l.* it is 16*s.* 6*d.*

In finding the commission, &c. by tables, it frequently requires when the rate is above 5 per cent., say 58*l.* at 6¼ per cent.) reference to two pages, then to two columns, then to four (sometimes eight) lines, then to pick out the parts from each of them, and then to add the whole together, with liability to err in every operation. By this method you have simply to multiply 58 by 12½, which makes 725, adding 1*d.* for the unit, which gives 726, that is, 3*l.* 12*s.* 6*d.*

Remarks.

The shillings produced by the multiplication (if any) are 15, 10, or 5. When there are no shillings, the commission is exact.

When 15*s.*, the commission, &c. is one tenth of a penny (which is not a farthing) too much.

When 10*s.*, it is four-tenths (which is not a halfpenny) too much.

When 5*s.*, it is three-tenths (which is not a halfpenny) too little.

VULGAR ERRORS RESPECTING THE BAROMETER.

The barometer has been called a weather-glass. Rules are attempted to be established, by which, from the height of the mercury, the coming state of the weather may be predicted; and we accordingly find the words "rain," "changeable," "fair," "frost," &c., engraved on the scale attached to common domestic barometers, as if, when the mercury stands at the height marked by these words, the weather is always subject to the vicissitudes expressed by them. These marks are, however, entitled to no attention; and it is only surprising to find their use continued in the present times, when knowledge is so widely diffused. They are, in fact, to be ranked scarcely above the Vox Stellarum, or astrological almanack. Such a scale would inform us that the weather at the foot of a high building, such as St. Paul's, must always be different from the weather at the top of it. It is observed that changes of weather are indicated, not by the actual height of the mercury, but by its change of height. One of the most general, though not absolutely invariable, rules is, that where the mercury is very low, and therefore the atmosphere very light, high winds and storms may be expected. The following rules may generally be relied upon, at least to a certain extent: — 1. Generally the rising of the mercury indicates the approach of fair weather; the falling of it shows the approach of foul weather. 2. In sultry weather the fall of the mercury indicates coming thunder. In winter the rise of the mercury indicates frost. In frost its fall indicates thaw, and its rise indicates snow. 3. Whatever change of weather suddenly follows, a change in the barometer may be expected to last but a short time. Thus, if fair weather follow immediately the rise of the mercury, there will be very little of it; and in the same way, if foul weather follow the fall of the mercury, it will last but a short time. 4. If fair weather continue for several days, during which the mercury continually falls, a long continuance of foul weather will probably ensue; and again, if foul weather continue for several days while the mercury continually rises, a long succession of fair weather will probably succeed. 5. A fluctuating and unsettled state of the mercurial column indicates changeable weather. The domestic barometer would become a much more useful instrument, if, instead of the words usually engraved on the plate, a short list of the best-established rules, such as the above, accompanied it, which might be either engraved on the plate, or printed on a card. It would be right, however, to express the rules only with that degree of probability which observation of past phenomena has justified. There is no rule respecting these effects which will hold good. — *Dr. Lardner.*

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ABSTRACTS OF THE MORE IMPORTANT OF THE LATEST PATENTED AND REGISTERED INVENTIONS.

Cotton's improved Weighing Machine. — Mr. Cotton, who is Governor of the Bank of England, has invented this machine for the purpose of weighing sovereigns, and separating the light ones from those of standard weight. It is so delicate, that it detects, with precision, a variation of a twelve thousand two hundred and fiftieth part of the weight of a sovereign. The coins are placed in a tube, or hopper, from whence they are carried on to a small platform, which is suspended over a delicately-poised beam, to the other end of which is appended the standard mint weight. On setting the machine at work, a sovereign is placed on the platform, and if it is full weight, a small tongue advances, and strikes it off into another till appointed to receive it; but, if it is light, the platform sinks, and brings it within the reach of another tongue, at a lower level, which advances at right angles to the former tongue, and pushes the coin into another till. Other coins succeed in rapid rotation, so that the machine can weigh and sort 10,000 sovereigns in six hours, while an experienced teller can at the utmost only weigh between 3000 or 4000 coins by hand-scales in the same time, and even then, the optic nerve, by incessant straining, becomes fatigued, and errors occur.

Rand's Collapsable Tubes. — The collapsable tube for holding colours, which is now in general use among artists, is one of the most valuable presents ever made by the Useful to the Fine Arts. The improvements comprehended under Mr. Rand's patent consist, *firstly*, in punching out by dies) the thin metal of which the collapsable vessel is formed, "with a short neck or nozzle" attached to it; and, *secondly*, in making a screw on that neck or nozzle, with a screw cap to fit, whereby the vessel will be less liable to leakage.

Budd's Process of manufacturing Iron. — This process of manufacturing iron, as contradistinguished from Nelson's and Crane's processes, may be called the cold anthracite blast. The points of novelty are these.

"First, the application of anthracite or stone coal combined with a blast of atmospheric air, in the natural or unheated state, maintained at a pressure of upwards of 2½ lbs. on the square inch, in the smelting or manufacture of iron from iron-stone, mine, or ore.

"Secondly, the application of anthracite or stone coal, combined with the use of water tuyeres, and with a blast of atmospheric air in the natural or unheated state, in the smelting or manufacture of iron from iron-stone, mine, or ore.

"Thirdly, the application of anthracite or stone coal, in combination with four or more tuyeres, and a blast of atmospheric air in the natural or unheated state."

Clay's new Process for making Wrought Iron direct from the Ore. — By the ordinary system of iron-making, the ores are reduced into the state of carburet of iron, and then, by refining and puddling, the metal is de-carburetted, thus making it into malleable iron by a number of processes, which are recapitulated —

1st. Calcining the ore.

2d. Smelting in a furnace, by the aid of blast, either cold or heated, with raw coal, or coke, for fuel, and limestone as a flux.

3d. Refining the "pig" into "plate" iron.

4th. Puddling, shingling, and rolling, to produce the "rough," "puddled," or No. 1 bars.

5th. Cutting up, piling and rolling, to produce "Merchant," or No. 2 bars.

6th. A repetition of the same process, to make "best," or No. 3 bars.

In order to diminish the number of manipulations, a mixture of dry Ulverstone, or other rich iron-ore (hæmatite), is by the new process ground with about four-tenths of its weight of small coal, so as to pass through a screen of one-eighth of an inch mesh. This mixture is placed in a hopper, fixed over a preparatory bed, or oven, attached to a puddling furnace of the ordinary form. While one charge is being worked and balled, another gradually falls from the hopper, through the crown, upon the preparatory bed, and becomes thoroughly and uniformly heated; the carburetted hydrogen and carbon of the coal, combining with the oxygen of the ore, advances the decomposition of the mineral; while, by the combustion of these gases, the puddling furnace is prevented from being injuriously cooled. One charge being withdrawn, another is brought forward, and in about an hour and a-half the iron is balled, and ready for shingling and rolling.

The cinder produced is superior in quality to that which results from the common system; it contains from 50 to 55 per cent. of iron, and is free from phosphoric acid, which frequently exists, and is so injurious, in all the ordinary slags; when re-smelted, it produces as much No. 1. and No. 2 cast-iron and of as good quality, as the ordinary "black band" ore of Scotland. The cast-iron produced from the slag (amounting to one-third of what was originally contained in the ore) is mixed with the ore and coal in the puddling furnace; and thus, while nearly all the iron is extracted from the ore, as much wrought-iron is produced in a given time, and at the same cost of fuel, as by the old system.

The first process, producing puddled bars of superior quality, is consequently on a par with the fourth stage of the old system, as it avoids the necessity of the preceding separate manipulations.

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From the absence of all deleterious mixtures, by once piling and reheating the rough bars, iron is produced, of a quality, in every respect equal, and in powers of tension superior, to that which results from the second piling and reheating in the common mode; it is therefore contended that the two processes produce from the hæmatite nearly one-third more iron, of as good a quality as is usually obtained by the six processes of the old system.

The iron thus produced bears a high polish, is very uniform in its texture, is ductile and fibrous, having more than an average amount of tensile strength, and at the same time appears to be more dense, as it possesses a peculiar sonorousness, resembling that of a bar of steel when struck. It has also been converted into a steel of good quality.

Henson's Flying Machine.—On this, which may be called the wonder of the year, Mr. Bishop, the eminent physiologist, makes the following conclusive remarks in the Mechanics' Magazine, No. 1028. "We are not destitute of data for estimating the force which is called into action in order to sustain, and keep in motion in the air, bodies, more or less heavy; sufficient has at least been done to enable us to form some conjecture respecting the probability of the success of Mr. Henson's machine. An elaborate memoir on this subject by M. Chabrier, has been published by the Institute of France, in which will be found a profound mathematical inquiry into the conditions necessary for the movement of machines in the air. In Dr. Todd's Cyclopædia of Anatomy and Physiology, Part 25. art. MOTION, I have contributed a number of illustrations, by ascertaining the weight of various insects, bats, and birds, and the amount of surface in each respectively. I have also computed the number of strokes made in a second by the wings of the rook and the pigeon during flight. It appears that the average weight of the pigeon is 4347·344 grains; that of the rook 4170·25 grains; and that of the canary 229 grains; whilst the areas of their wings are respectively, 0·6198, 1·11, and 0·054 of a square foot. Hence we see that the areas of the wings of birds do not vary as their weight; and that the rook has nearly half a pound weight to the square foot, and the pigeon one pound; the former making two, the latter three, effective strokes of the wings in a second. The weight of the former is therefore greater, that of the latter less, in proportion to the surface presented to the wind, than in Mr. Henson's machine. It must, however, be borne in mind, that in this machine the surface presented to the wind has no motion like the wings of birds, neither does the machine possess the power of ascending vertically. In birds, on the contrary, according to Borelli, the power of the muscles which move the wings, compared with their weight, is more than 10,000 to 1; whilst their mass, compared with the muscles moving the legs, is as 3 to 1. We agree with M. Chabrier, that the amount of force requisite for aërial progression is so enormous, owing to the rarity of the atmosphere, that it would be impossible for a man to sustain himself in the air by his muscular strength alone, in any manner in which he is capable of applying it. For example, it is calculated that a man can raise 13·25 lbs. avoirdupois to a height of 3·25 feet in a second, and that he can continue this exertion for eight hours in a day. In that space of time he will therefore exert a force capable of raising 381600 lbs. to a height of 3·25 feet, or 47700 lbs. to a height of 26 feet, which, according to M. Chabrier, is the height to which the swallow would raise itself in a second of time, by the force which it is obliged to exert in order to sustain itself in the air. Now, if we suppose the conditions necessary for flight in man to be the same as in birds; and that a man whose weight is 150 lbs., could concentrate the muscular power of a day's labour into as short a period as the accomplishment of the object required, the time, t, during which he would be enabled to support himself in the air would be,

$$150\,t = 47700;$$

hence, $t = \frac{47700}{150} = 318''$, or about five minutes. The surface of the wings in the rook and the pigeon, when expanded, will not support them stationary in the air, unless they move with rapidity; for, when the wings of the rook are expanded motionless in the air, the bird descends by its own gravity with considerable velocity; and as it has a greater surface, compared with its weight, than Mr. Henson's machine, it follows that the latter would be precipitated to the earth with still greater velocity, should the propelling apparatus get out of order in its transit through the air. It appears, by M. Chabrier's analysis, that the quantity of force expended to keep a body, whose weight is W, stationary in the air (all other conditions being supposed the same), is as $\sqrt{W^3}$ directly, and $\sqrt{}$density of the air inversely."

Clark's Pyro-hydro-pneumatic Apparatus.—The most novel part of this apparatus is a steam condenser, which acts without the aid of cold water, or the coiled or any other tubing hitherto used in the process of distillation. The vessel used by Mr. Clark is capable of receiving and condensing a certain quantity of steam as fast as it comes over out of the boiler, and to do so at an equal ratio, without interruption. The liquid obtained is of as low a temperature as any produced in the common way. It is well known that the steam of certain liquids, when reaching the still-head (whence it is generally made to pass direct into the narrow coil pipe), remains impregnated with a proportion of such elementary impurities contained in the steaming liquid, as are capable of being atomically

volatilised by a boiling heat exceeding 212°. Whenever these generally heavy impurities convey a bad taste, the condenser, as well as some other vessels connected with it, have the effect of removing such taste, without destroying any of the purer liquid combined with such odorous effluvia, which, as it were, rise at the top of the steam. This condensing apparatus may be attached to any still; and, in addition to its utility on the large scale, it will prove a great convenience in all distillations on the small one, by rendering the aid of the cold water tube unnecessary, yet condensing with uniform regularity, and making it possible to purify or rectify the steam rising into the still-head, prior to its liquefaction by the condenser.

Dr. Payerne's Method of living under Water. — The English patentee of this remarkable discovery is Mr. William Revell Vigers. 1. The first thing claimed by the patentee and specified is the depriving of the atmosphere in confined places of the carbonic acid gas which it contains, produced from respiration or combustion, by means of quick lime and caustic alkali, or of the lime alone, which is to be dissolved in eight times its weight of water. The air in the apartment is to be passed through this caustic solution by a pair of bellows, the nozzle of which reaches nearly to the bottom of the vessel containing the lime and water. The vitiated air thus coming in contact with the lime, the carbonic acid gas is absorbed. It is calculated that one cubic foot of atmospheric air must be purified for each person per minute.

2. The patentee claims the restoring the requisite quantity of oxygen, to supply the place of that consumed; which oxygen is to be procured from the chloride of potash, or driven off from the peroxide of manganese by means of heat, into the apartment, or allowed to escape from vessels into which it may have been previously compressed.

3. The patentee claims further, the purification of the air contained in the diving-bell, by the process described in claim 1., and the restoring the requisite proportion of oxygen from a vessel attached to the diving-bell, into which the oxygen has been previously compressed; also the allowing the escape of atmospheric air, which has previously been compressed several atmospheres into two compartments, one of which is situated at each end of a diving-bell, somewhat resembling a boat inverted, the centre one being occupied by the diver or workmen, who may, by means of stop-cocks, regulate the supply according to their wants.

The specification is of extraordinary length, filling no less than ten skins of parchment, but the above extract contains all that is material in it.

Another English patent has been since taken out by Dr. Payerne himself for a series of improvements, which are said to be of so much importance as to supersede entirely the methods described in Mr. Vigers's patent

Clegg's Dry Gas-meter. — This instrument is constructed on the same principle as Professor Leslie's well known differential thermometer, and is not at all inferior to it in delicacy of performance. In size it is so diminutive, that a meter, capable of measuring six burners, called a six light meter, is but nine inches in height; and this admits of its being placed on the chimney-piece, or any other convenient place in a room, where it may be constantly under the eye of the gas consumer, instead of being consigned, like the water meter, to the cellar or kitchen. The case, too, may be made of any material, as iron, bronze, or ormolu; and it may be cast or carved of any form desired, so as to render the gas-meter as great an embellishment to the chimney-piece as a clock, vase, or any other ornamental article. When the brilliancy of the gas is increased, the caloric imparted to the heater is increased in proportion; *thus the quantity of light is measured* (the legitimate object of a gas-meter), and encouragement is given to gas companies to make gas of superior brilliancy, greatly to the advantage both of venders and consumers. The meter is adjusted with gas of medium quality; and to whatever extent the gas may exceed that, in illuminating power, it will be duly registered. The pressure or temperature of the gas from the main, whatever it be, makes no difference in the measure.

Whitworth's Self-loading Cart, or Street-sweeping Machine.—The Self-loading Cart which has been lately brought into operation in London, and previously in the town of Manchester, is the invention of Mr. Whitworth, of the firm of Messrs. Joseph Whitworth and Co., engineers, by whom it has been patented, and is now in process of manufacture. The principle of the invention consists in employing the rotary motion of locomotive wheels, moved by horse or other power, to raise the loose soil from the surface of the ground, and deposit it in a vehicle attached. The apparatus consists of a series of brooms suspended from a light frame of wrought iron, hung behind a common cart, the body of which is placed as near the ground as possible, for the greater facility of loading. As the cart-wheels revolve, the brooms successively sweep the surface of the ground, and carry the soil up an inclined plane, at the top of which it falls into the body of the cart. The apparatus is extremely simple in construction, and has no tendency to get out of order, nor is it liable to material injury from accident. The draught is not severe on the horse. Throughout the process of filling, a larger amount of force is not required than would be necessary to draw the full cart an equal distance.

The success of the operation is no less remarkable than its novelty. Proceeding at a moderate speed through the public

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streets, the cart leaves behind it a well-swept track which forms a striking contrast with the adjacent ground. Though of the full size of a common cart, it has repeatedly filled itself in the space of six minutes. This fact, while it proves the efficiency of the new apparatus, proves also the necessity for a change in the present system of street-cleaning. The state of the streets in our large towns, and particularly in the metropolis, it must be admitted, is far from satisfactory. It is productive of serious hinderance to traffic, and a vast amount of public inconvenience. The evil does not arise from the want of a liberal expenditure on the part of the local authorities. In the township of Manchester, the annual outlay for scavenging is upwards of 5,000*l.* This amount is expended in the township alone. In the remaining districts of the town, the expense is considerable. Other towns are burdened in an equal, or still greater, proportion. Yet, notwithstanding the amount of outlay, the effective work done is barely one-sixth part of what would be necessary to keep the public streets in proper order.

The process of street-cleaning consists of three parts, viz., sweeping, loading, and carrying. Under the present system, these are entirely distinct operations. Each of them constitutes a protracted and expensive process; and the two former absorb a large amount of human labour. By the aid of the self-loading cart, one horse is enabled to perform all the three processes, which are not only carried on simultaneously, but, as it were, blended in one operation; whilst each is so far simplified as to render the combination less complex and protracted than the single process of either sweeping or loading by the present mode.

By the present mode of sweeping, the dirt is first moved from the centre to the sides of the street, and there collected into heaps for convenience in loading. An immense amount of time and labour is thus consumed; the mass of dirt being moved over a wide extent of surface, and the operation of cleaning continually retarded by the accumulation. It is calculated that each particle, on the average, moves through twenty feet of space before the operation of loading commences, and that the preparatory sweeping for each load consumes the greater part of a day's labour.

Here the advantage of the patent apparatus is self-evident. It entirely supersedes the whole process just referred to. The dirt, instead of being swept from one part of the street to another, is swept at once into the cart, and the street is cleared effectually. The operation of sweeping, in fact, merges into that of loading, and both are performed without the intervention of human labour. When going at the rate of only 2 miles per hour, with brooms 3 feet wide, the patent apparatus will clean nearly 60 superficial square yards per minute. This is about the average rate of work done by 36 men. Supposing the apparatus to work 5 hours per day, it would clean 18,000 yards, equal to the performance of 18 men.*

There is another view of the subject, deserving of particular attention, — viz. the tendency of cleanliness to promote the durability of streets, and, consequently, to diminish the expense of repairs. This is so great, that even under the present system it would be decidedly economical to clean them oftener. When dirt is allowed to collect on the surface, the water is prevented from running off, and soaks down to the foundation, which, becoming soft, yields to the first pressure. The surface of the street is thus rendered uneven, and the injury, though slight at first, is continually augmented. Carriage and waggon wheels revolve in the hollow places with the violence of concussion. The soil underneath rises between the stones to the surface, causing a new settlement, and forming the principal part of the substance to be carted away. This shows how extremely false a policy it is to allow the dirt to collect in the first instance. In the end, a double quantity is produced, and must be removed, while the structure of the street, which otherwise might have lasted unimpaired, is completely broken down. Satisfactory evidence, in confirmation of this statement, is furnished by the tables of scavenging, published in the Reports of the Manchester Police Commissioners. In the year 1840, 16,000,000 superficial square yards were swept, and 37,000 loads of dirt removed. In the following year, the surface swept was 22,000,000 square yards, and only 30,000 loads were taken. The extent of sweeping was greater by 6,000,000 yards, while the number of loads was less by 7,000. The extra loads removed in the former year must have consisted principally of water and sub-soil, of which the quantity, in the following year, was diminished by more frequent cleaning.

The expense now incurred in repairing streets, is considerably greater than in cleaning; and the economy which the improved system is calculated to effect under the former head, is no less remarkable than under the latter. But a still greater advantage, even in point of economy, will arise from the improved condition of streets, as affecting the draught of horses, and wear and tear of vehicles of all kinds. This is now so great, from the want of cleanliness and the bad state of repair, that the extra tax on horse power alone, if converted into money, would more than defray all expenses incurred in relation to both objects.

* In the township of Manchester, 22,000,000 yards were swept during the year 1841: 60 sweepers and 20 carters were employed, of whom, say 67, were constantly occupied in sweeping or loading. This would give 1,000 yards per man per day. The labour of paupers is found not to be so effective.

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Keely and Alliott's Patent Drying Machine.—The idea of drying soft goods by causing them to revolve rapidly, and imparting thereby a strong centrifugal tendency to the liquid particles contained therein, is not new—for there have been two or three machines for the purpose before the present; but hitherto it has been followed out with only very partial success, owing to the difficulty of so constructing a machine that the parts of it shall hold together at the high velocities necessary for drying goods rapidly. In one instance, where a machine of this sort was pushed to a speed of not more than about 300 turns a minute, a plate belonging to it flew off at a tangent, and cut the head of the attendant clean off. In the apparatus of the present patentees, this difficulty has, by a very happy combination of contrivances, been at length completely mastered. It is able to revolve with perfect safety at the rate of from 1500 to 2000 revolutions per minute. The inventor is a Prussian gentleman of the name of Seyrig, from whom the English patentees, Messrs. Keely and Alliott derive their title. The principal part of the machine consists of a double drum, or drum of two compartments, fitted loosely to a vertical revolving shaft. Within the inner compartment of this drum a governor (such as is used in steam engines) is suspended by two weighted arms loosely affixed at their elbows to studs in the top plate of the drum, so as to turn freely thereon, and resting by their upper ends on a ruff projecting from the vertical shaft. When a rotary motion is given to the shaft, it carries round with it the drum, and in proportion to the velocity of the motion, there is a centrifugal tendency imparted to the liquid particles contained in the goods (which is the useful effect desired to be produced by the machine); but as the same centrifugal tendency in the parts of the machine would, in case of any unequal distribution of the weight, cause, if not counteracted, an injurious strain on the central shaft, and might cause at the high velocities necessary for drying goods quickly, an actual disruption of the machine, and as this difficulty is increased when the weight of the goods happens not to be quite equally distributed over the drum, the governor obviates all such consequences. For, as the speed of the shaft increases, the arms of the governor expand and gradually raise the drum from off its seat, and thus leave the drum free to adjust itself according to its natural gravitating tendencies, so as to bring the centre of gravity in uniform coincidence with the centre of rotation. At the Lenton works, near Nottingham, Messrs. Keely and Alliott have a machine of this sort in operation, the drum of which is 36 inches in diameter, and which is worked usually at the rate of from 1500 to 1600 revolutions per minute. A machine of the same magnitude on any other plan could not be worked with safety at half that speed.

Machine for raising and lowering Miners.—The great depth to which the copper and tin mines, in Cornwall and in Germany, have been worked, has drawn simultaneously in the two countries the attention of engineers to some mode of facilitating the ascent and descent of the miners, whose strength is exhausted, and their health seriously affected, by the fatigue of going to and returning from the scene of their labours by nearly vertical ladders, as the men cannot be raised and lowered by the rope of the winding engines as in the coal districts. The Polytechnic Society of Cornwall offered premiums for machines for affecting this object, and in 1834 three prizes were respectively awarded to Mr. Michael Loam, Capt. W. Nicholas, and Capt. W. Richards for plans, the two first of which embraced the principle which has since been adopted with modifications, both in Germany and in Cornwall. A premium was also offered by Mr. Tremayne for any new method, or for the most available improvement on the former plans, and this was awarded in 1838 to Mr. John Philips for a method, differing, however, from that which has been put in practice. About this time it was ascertained that a machine, somewhat similar to that designed by Mr. Michael Loam, had been applied with success to one of the deepest mines in the Hartz; and drawings, with a description, were published in the Report of the Polytechnic Society of 1838. Mr. Charles Fox also commenced a subscription, for the purpose of awarding a sum of money to any proprietor of mines, who would first bring into active operation efficient machinery, adapted for the purpose in question. At length, the adventurers of the Tresavean copper-mines undertook to erect a machine from the designs and under the superintendence of Mr. Michael Loam; it was first used for a depth of 27 fathoms, on the 5th of January, 1842; has since been extended to 264 fathoms; and it is now contemplated to carry it to the lowest part of the mines, which is 288 fathoms deep. The machine, which is worked by a steam-engine, with a cylinder of 36 inches diameter, consists of two rods, to which are attached, at intervals of 6 feet throughout their length, platforms upon which the men stand: these rods receive an alternating motion from two cranks, which give them a stroke of 12 feet; the men either in ascending or descending, step from one platform to the other, as the rods remain for an instant almost stationary, when the cranks are going over top and bottom centres; and as the platforms are half the length of the stroke apart, one set of men can ascend while another set is descending, without at all interfering with each other. Each rod makes three strokes per minute; and when once the platforms are filled with men, they are landed at the rate of six men per minute, either going up or down; the speed of travelling being about 72 feet per minute, or 240 fathoms in 20 minutes. By

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the ordinary mode of ascending by ladders, it would have occupied 48 minutes to mount from the same depth, as the usual speed is about 30 feet per minute, so that more than 50 per cent. of time is saved, independent of the diminution of fatigue. The rods at the Tresavean mine act vertically for the first 70 fathoms, below which they follow the direction of the vein, diverging from the perpendicular from 6 inches to 18 inches in 6 feet. The action of the apparatus is stated to be perfectly successful; no accident has occurred in the use of it, and the miners are convinced of the safety as well as the ease afforded by it.

The Faraday Ventilating Lamp. — In consequence of the injury sustained by the books in the library of the Athenæum Club, and the complaints made by the members, of the vitiated state of the air in the rooms, the attention of Professor Faraday was drawn to the subject, and he suggested the trial of various plans for effecting the removal of the products of combustion, and for the ventilation of the lamp-burners. Oil and gas both contain carbon and hydrogen, and it is by the combination of these elements with the oxygen of the air that light is evolved. The carbon produces carbonic acid, which is deleterious in its nature, and oppressive in its action, in closed apartments, and the hydrogen produces water. A pound of oil contains about 0·12 of a pound of hydrogen, 0·78 of carbon, and 0·1 of oxygen; when burnt it produces 1·06 of water, and 2·86 of carbonic acid, and the oxygen it takes from the atmosphere is equal to that contained in 13·27 cubic feet of air. A pound of London coal-gas contains, on an average, 0·3 of hydrogen and 0·7 of carbon; it produces, when burnt, 2·7 of water and 2·56 of carbonic acid gas, and consumes 4·26 cubic feet of oxygen, which is equal to the quantity contained in 19·3 cubic feet of air. A pint of oil, when burnt, produces a pint and a quarter of water, and a pound of gas, more than two and a half pounds of water; the increase of weight being due to the absorption of oxygen from the atmosphere, one part of hydrogen taking eight parts (by weight) of oxygen to form water. A London Argand gas lamp, in a closed shop window, will produce in four hours two pints and a half of water. A pound of oil also produces nearly three pounds of carbonic acid, and a pound of gas, two and a half pounds of carbonic acid. For every cubic foot of gas burnt, rather more than a cubic foot of carbonic acid is produced. As carbonic acid is a deadly poison, an atmosphere containing even one-tenth of it is fatal to animal life. The various accidents from lime and brick-kilns, brewers' vats, occasionally from the sinking of wells, and from the choke-damp in coal mines, attest the danger contingent upon the presence of this substance. A man breathing in an atmosphere containing seven or eight parts of carbonic acid would suffer, not from any deficiency of oxygen, but from the deleterious action of the carbonic acid. M. Leblanc has recently analysed carefully the confined air of inhabited places, and concludes that the proportion of carbonic acid gas in such places may be regarded as measuring with sufficient exactness the insalubrity of the air; that in the proportion of 1 part to 100 of air, ventilation is indispensable for the prevention of injury to the health; that the proportion of carbonic acid gas should not exceed a five-hundredth part, though it may extend without inconvenience to a two-hundredth part. If a room twelve feet square and twelve feet high, with the doors, windows, and fire-place closed, has a gas lamp burning in it, consuming five cubic feet of gas per hour, the light will produce sufficient carbonic acid, in rather more than three hours, to be in the proportion of 1 part to 100 of air, and, as M. Leblanc states, when in such condition the air is decidedly injurious to health: and even in one hour and a-half it will produce that proportion of carbonic acid which he considers should never be exceeded. The experiments made by Professor Faraday have led him to a modification of the ordinary mode of ventilating by ascension. Finding that there was sufficient draught in the main part of the metal chimney to allow of a descending current over the lamp, the tube, instead of going directly upwards, was made to turn short over the edge of the glass, to descend to the arm or bracket, to pass along it, and then ascend at the central part of the chandelier, or against the wall, if applied to a single light. To this succeeded another form, which is very simple, and is, in fact, only a correct application of the principle of a descending draught to a lamp-burner. The gas-light has its glass chimney as usual, but the glass-holder is so constructed as to sustain not merely the chimney, but an outer cylinder of glass larger and taller than the first; the glass-holder has an aperture in it, connected by a mouth-piece with a metal tube, which serves as a ventilating flue, and which, after passing horizontally to the centre of the chandelier, there ascends to produce draught, and carry off the burnt air. With a lamp burning in the ordinary way, the products of combustion issue from the top of the glass chimney into the apartment; but if the above arrangement be applied, on closing the top of the outer glass cylinder by a plate of mica, all the soot, water, carbonic acid, sulphurous and sulphuric acid, and a portion of the heat, are carried away, and discharged into a chimney or into the open air; and the air in the rooms may thus be kept as fit for the purposes of respiration, as if artificial light were not being used.

A curious result of the enclosed lamp is the increase of light produced, amounting, it is stated, to from 10 to 20 per cent., according to circumstances, the same quantity of gas being consumed as before.

This invention is not objectionable in

architectural appearance; the ventilation by the lamp is perfect; the heat given to a room is modified, and may be either sustained or diminished at pleasure; the light is increased, and additional safety from accidents is obtained, as in the event of any leakage from the pipes, or from a gas-cock being inadvertently left open, the gas, instead of mixing with the air of the room and becoming explosive, is carried off by the metal tubes.

Malleable Iron Shot. — A patent has been taken out this year, by a Mr. Rolinson, for manufacturing iron shot by cutting, compressing, and rolling, instead of by casting as usual, the iron being of course in a wrought or malleable state before it is operated upon. The new shot possesses much greater density, bulk for bulk, than shot of the common sort, is truer in point of form, and less liable to deterioration from exposure to the weather. The mode of manufacturing it is thus described: — The patentee takes a common round bar of wrought or malleable iron, and heats it in a furnace to nearly a welding heat, when he divides it by a circular saw, or with shears, into pieces, corresponding, as regards the solid contents thereof, with the weight of the shot intended to be manufactured, making a small allowance for waste in the subsequent processes. He puts these pieces into common spherical moulds, such as are used in the manufacture of iron shot by casting, and applies, by any of the common and well-known methods, a degree of pressure sufficient to round the pieces enclosed in the moulds. He then passes the rounded pieces through a rolling machine, which, in its general construction, is similar to the metal-rolling mill in common use, and differs from it in two respects only; first, the roller has three grooves cut in its exterior surface all round, each of which grooves is of an exactly semicircular form, and of the same diameter as the shot is intended to be; secondly, a quadrant-shaped cup is placed opposite and close to the grooves in the roller, and is divided in its upper surface into three semicircular grooves corresponding exactly to those of the roller, so that the two sets of semicircles form together three perfectly circular channels. The roller being put in motion by a connecting band from a steam-engine, or other moving power, the pieces of iron are removed from the spherical moulds where they are first rounded, and while they are yet in a hot state, and dropped into the circular holes formed by the meeting of the grooves in the roller, and those of the stationary cup, and after they have been forced through these holes by the rotary action of the roller, they are subjected a second time to the same process, or as much oftener as may be deemed expedient.

Processes for preserving Wood.—A great many persons have sought to monopolise the use of preservatives for timber, of which it is to be feared there are few, if any, that have much pretension to novelty. Amongst these patentees, the most prominent are, Mr. Bill, Mr. Kyan, and Sir William Burnet. Bill's patent is (we believe) for the impregnation of wood with a preparation of coal tar. Burnet's patent is for impregnating timber with the chloride of zinc, aided by exhaustion, and subsequent pressure. Although timbers prepared by both of these patent processes have been subjected to some strong tests with favourable results; and though Burnet's process has recently found some strenuous advocates, and is now being introduced upon a large scale into the English dock-yards, neither of them have, as yet, been very extensively employed. The antiseptic process, generally known as Kyan's, has acquired the greatest notoriety, and has probably been more extensively used than any of the others. Kyan's process, which, under the name of *kyanising*, has even added a word to our language, consists of steeping timber in a solution of the corrosive sublimate of mercury, formed in the proportion of 1 lb. of cor. sub. to 5 gals. of water, and continuing the immersion for a longer or shorter period, according to the dimensions of the piece of timber immersed. The application of corrosive sublimate of mercury to vegetable substances, as an antiseptic, had been, many years before, prescribed by Chapman and Davy, and had even been directly applied by the former, with success, to the preservation of wood; still, as the efforts of these distinguished men had failed to attract the attention or command the confidence of the public, to an extent sufficient to introduce this antiseptic into use among practicians, Mr. Kyan deserves credit just so far as he was the means of reproducing the invention, demonstrating its utility anew, and finally of introducing it into constructions at large, and rendering it generally available for practical purposes. In addition to the above modes of augmenting the durability of timber, impregnation with oil, under great pressure, has been proposed by M. Breant; and some successful experiments with wood thus prepared have been tried in the flooring of a bridge in France. A powerful hydrostatic pressure, following a previous exhaustion, has been found useful in promoting a thorough impregnation of timber with metallic salts in solution; and impregnation with *kreosote* has also been proposed by M. Moll. Recently a cheaper metallic salt, and a different and superior mode of thoroughly impregnating the timber, has been proposed for use by M. Boucherie, and illustrated by many experiments of a conclusive nature. Boucherie's method is to employ the impure pyrolignite of iron as the antiseptic salt of impregnation, and to cause it to insinuate itself into all the pores of the wood, by means of the singular power of aspiration developed by the sap of newly-felled trees. M. Boucherie's plan, in brief, is to fell the trees, and lop off all the branches except the top;

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then to connect the lower end of the trunk by means of a water-tight bag, or any other suitable means, with a reservoir containing a saturated solution of the impure pyroligenite of iron; then the sap being gradually exhaled from the leaves remaining upon the upper branches, the ferruginous liquid is drawn up into the body of the tree, until, in a few days, it reaches the outermost branches, and fills all the capillary tubes of the timber, coagulating and solidifying in its progress all the albumen of the wood, and greatly augmenting its durability, by rendering it so close, solid, and hard, as to repel air and moisture. Such is the force with which the sap is propelled forward through the pores of the body of a tree, in consequence of the exhalation from the top, when newly felled, that Dr. Hailes, in his Vegetable Statistics, published about a century ago, mentions the case of a freshly-cut vine-branch, which, being plunged at its lower end into mercury, drew that metal up into its tubes to the height of 38 inches, thus actually evincing a power superior to that with which the atmosphere acts against a vacuum. From the satisfactory character of the numerous experiments adduced by M. Boucherie, there is strong reason to believe that this process will be very efficacious. In point of fact, from the results of experiments which have been made, we are led to infer, that a thorough impregnation with the salts of iron may answer the end of considerably prolonging the durability of timber, and probably render unnecessary the application of the more expensive salts of copper, or mercury, which seem to be more active antiseptics.

In 1836, Sir William Burnet suggested, and was instrumental in testing on a large scale, a more effectual mode of causing antiseptic solutions to impregnate timber, than mere immersion was found to be; this was by piling the wood within a suitable iron tank, then exhausting the tank to a partial vacuum, represented by a pressure of about five inches of mercury, then admitting the antiseptic solution; and, finally, subjecting the fluid to a pressure of about 100 lbs to the inch above the atmosphere. This method, with the chloride of zinc employed as the antiseptic, has found some vigorous advocates, and is now beginning to be extensively applied abroad.

A leading objection urged against Kyan's process is, that the deuto-chloride of mercury employed *does not* coagulate the albumen of the wood, or vegetable tissue, into an insoluble compound, since kyanised sails have had the corrosive sublimate so thoroughly washed out of them by the exposure of a single voyage, that an application of the usual chemical re-agents failed to detect a trace of mercury. Some wooden piles, also, which had been kyanised, and used in a sea work, were cut to pieces in a short time by the *teredo navalis*, or ship-worm; thus rendering it probable that, in these cases also, the corrosive sublimate had been washed out.

Sir William Burnet's process of impregnating wood, &c. with a solution of the chloride of zinc, aided by exhaustion and pressure, is said to be free from the objection urged against that of Kyan; it seems to be superseding *kyanising* in the favour of the Commissioners of the Admiralty; and nearly all the naval timber, sails, cordage, &c. to which antiseptics are there applied at present, are treated by Burnet's zinc antiseptic process, under the name of *burnetising*.

One of the most recent antiseptic projects, is that of a Mr. Payne, who, calling both exhaustion and pressure to his aid, first impregnates timber with a solution of sulphate of iron, and afterwards with muriate of lime, which is said to attain the desideratum of forming an insoluble compound within the interior of the timber, and, by its means, preserving the wood from decay.

Self-priming Gun.— Messrs. Needham, the gun makers, of 26. Piccadilly, have recently obtained a patent for an important and very useful improvement in percussion locks, by which the caps are, by the motion of the lock, placed at once, and without the trouble of putting them on the nipple, as in common percussion locks, with the fingers, in a small cavity beneath where the nipple generally is, and there held fast till exploded on pulling the trigger. The contrivance further provides, that directly one cap is exploded it is forced from its cavity, and another cap instantly takes its place. The caps are contained in a hollow groove along the sides of the stock, which groove is covered with a small plate of brass, which does not increase the bulk, or render the stock unsightly. The groove holds sixty caps, which lie in it in such a way that it is an impossibility for them to stick in or block up the passage to the lock, and there is a small and simple instrument to feed or replenish the groove or reservoir when empty. From the description, it would appear that the contrivance is complex; but such is not the case; the whole is simple, and is effected by a small lever placed in the lock, upon which the cock works. It has these advantages over the method now in use:— additional power from the cap or priming being brought immediately upon the charge without the intervention of a nipple, the impossibility of the caps falling off or being lost, the protection of them from wet, the total avoidance of danger from the caps flying to pieces so as to injure the shooter, and the increased expedition in firing, in the proportion of five times to three. In guns used by the military this invention is very obviously an improvement of the greatest importance. The soldier will never miss fire, and will fire with a rapidity hitherto never calculated upon, and the cavalry soldier will be able to trust to his pistol or carbine with the con-

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fidence arising from the certainty that the cap has not slipped off; a certainty on which he cannot now rely, because a very little experience will show that it is not a very easy matter for a horseman in action to fit a cap to the nipple of a percussion lock. To sportsmen the same advantages will arise.

Galvanic Light. — A highly-interesting experiment with the galvanic light, proposed by M. Archereau as a substitute for that of gas, was lately made on the Place de la Concorde. The light exhibited appeared to be about an inch and a half in diameter, and was enclosed in a glass globe of about twelve inches in diameter. In the first instance, the gas-lights of the Place de la Concorde, which are 100 in number, were not extinguished. The appearance of those nearest the galvanic light was quite as faint, and had the same dull hue, as the ordinary oil-lamps when near a gas-light of the full dimensions. When the gas-lights of the place were put out, the effect of the galvanic light was exceedingly brilliant, eclipsing even, in the opinion of many present, that of the hydro-oxygen light. It was easy to read small print at the distance of 100 yards, and it was only necessary to look at the shadow of the objects in the way of the light to be convinced of its great illuminating power. The single light exhibited did not replace the whole of the gas-lights which had been put out, but it is estimated to have been equal, at least, to twenty of the gas burners of the Place de la Concorde, where they are larger in volume than in most of the other parts of Paris. It would, therefore, require five of these galvanic lights to light the whole of the place; but the rays of these five lights meeting each other, would, in all probability, give a much more intense light, to say nothing of the superiority in softness and colour over the present gas-lamps.

New Shoe Machine. — The New York *Evening Post* gives the following description of a mode of making shoes, by a machine owned by a Mr. Ruggles of that city: — "The sole leather is first pressed between wooden rollers, which makes it extremely firm and compact, much more so than hammering can do. It is then placed under a cutting machine, which at one operation cuts it into the proper shape. Meanwhile another machine is busy in making steel wire into screws of about three feet in length, all of which is done with surprising celerity. A fourth machine punches the sole with holes, inserts the screw, and cuts it off at its proper length. All that is then necessary is to rivet the screws by a few blows with a hammer on an anvil."

Stocking Machine worked by a Dog.—The New York *Sun* says, "There is now in the American museum exhibition room a little machine, worked by a dog, making stockings at the rate of dozens per day! The excellence of the hose made by this machine, and the economy by which it may be managed, defies all competition. Hitherto the Europeans have been able to manufacture hosiery cheaper than we could, but now we can compete with them successfully. The invention of this rotary knitting machine was perfected last winter by a young man named French, of Cabotville, Massachusetts. It is a remarkable contrivance. We have seen some of the canine race go to a distant field, drive up the cows, churn butter, and pound clothes, by walking on a tread-wheel; but dogs knitting stockings goes far ahead of our mechanics."

New Iron Beacon for the Goodwin Sands. — This beacon, which it has cost the inventor no little pains and expense to mature, is what we shall term, after his own language, "ponderous footed" It consists of a cast iron chamber, six feet six inches high by four feet square, terminating in a solid point, and weighing about four tons. Within the chamber there is contained a socket, which is strengthened by iron brackets. In this socket is fixed five feet of the circular shaft of the beacon, which is made of inch-iron, cast hollow, the diameter of the lower part of the shaft being seven inches, and of the upper six. The two portions of the beacon are united by a flange and core; and the entire height, from the top of the chamber to the mark, is twenty-seven feet. The mark is an ellipse, six feet by four in diameter, composed of round bars of wrought inch-iron, strongly secured to the shaft by a flange and core, constructed so as to form a most conspicuous beacon, and also to offer the least possible resistance to the action of the wind. Next spring, by the direction of the Elder Brethren of the Hon. Trinity Board, it will be planted at the eastern end of the dangerous Goodwin, on the south side of the Swatchway into Trinity Bay. The sand at this part of the Goodwin is of a very hard and compact nature, so as to render the sinking to any depth a task of no very easy completion; but it is expected that the ponderous foot, or base of the beacon, being inserted some nine feet in the sand, the pressure from without of the sand upon the sides and the top of the base, in addition to its own weight (which, when filled with sand, will be upwards of six tons), will secure its perpendicular position and stability. The firmness of the sand at this part of the Goodwin, where the beacon is to be placed, will, of course, be favourable to its ultimate security.

Leviathan Telescope.—The Earl of Rosse has nearly completed a telescope, which, for magnitude and power, will surpass every thing of the kind ever before constructed. It is thus described by the Rev. Dr. Robinson: — "The speculum, which weighs three tons, has been ground to figure, and can be polished in a day. The tube, partly a cubic chamber where the mirror is fixed, and partly a cylinder, of inch deal, strongly hooped, and eight feet diameter at its centre, is complete. The massive centres on which the telescope is to turn are in

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their place, and the apparatus which supports the speculum, which is of iron and of great weight, is also complete. The telescope is not to be turned to any part of the sky, but limited to a range of half hour on each side of the meridian, through which its motion will be given by powerful clockwork, independent of the observer. For this purpose it stands between two pieces of masonry of Gothic architecture. One of these pillars will sustain the galleries for the observer, and the other the clockwork and other machinery; one of which is finished, and the other nearly completed. An extremely elegant arrangement of counterpoises is intended to balance the enormous mass, so that a comparatively slight force only will be required to elevate or depress it, much of which is also completed; and Lord Rosse considers that two months will be sufficient to have the instrument fit for trial. The arrangements will not permit the examination of an object at any time, but only when near the meridian, when objects are best seen. So large a telescope will always require the most favourable circumstances of air, &c., and there will always be enough of objects at any given time to employ it fully. The aperture is six feet, and the focal length fifty-two feet."

The Atmospheric Railway.—One of the greatest triumphs of modern science has been achieved — atmospheric railway travelling is no longer a theory—it is now a practical result of unerring principles and mechanical skill; and to Ireland belongs the honour of having first risked the experiment, and carried the enterprise into an example for the rest of the world to profit by as well as herself. An experimental line, on this principle, has been laid down from Dublin to Dalkey, and is now on the point of being opened. Although but a mile and three quarters long, it presents some rather formidable difficulties: starting from Kingstown, for more than half the distance it is a succession of sharp curves, three of which are little more than 500 feet radius, whilst the ascent to Dalkey in that short distance is 71½ feet perpendicular—the small portion of this distance, which is unaffected by stopping, or starting, is uniformly passed over at a rate exceeding 40 miles per hour, the inclination being 1 in 115; the train of six carriages, crammed with passengers, has been occasionally permitted to travel at between 50 and 60 miles per hour; and on one occasion a single carriage was sent at a rate of upwards of 80 miles per hour; and, on this occasion, the re-sealing of the long valve was perfectly effected. Several times the train has been stopped by the brakes within 200 yards, the full power of the engine being still applied; and, after remaining at rest for about half a minute, a velocity of 35 miles per hour was obtained within half a mile up the same incline of 1 in 115.

The centrifugal tendency to fly off at a tangent has been admirably counteracted by corresponding elevations and depressions on either line of rails, as the case may require; and as no danger could arise even in the narrowest practicable curves from this cause, except from an excess of velocity, that excess has been amply provided against by a most ingenious contrivance for regulating the degree of exhaustion to be maintained in the cylinder while passing through the curves. It is very simple, and quite efficient. In the piston carriage (which leads the train) stands a barometer, from the top of which a tube passes down and runs along the piston rod till it reaches and perforates the piston, and thus communicates with that part of the cylinder in advance which is undergoing the process of exhaustion; the amount of which is thus ascertainable in the piston carriage, from whence the engineer can communicate by signals with the engine-house, and thus regulate the element of motion. At present this is done by flags and other signals; but it is intended to establish along the line an electric telegraph, by which communication can be carried on with the speed of thought, and with infallible certainty. When this delicate instrument shall be complete, nothing will be wanting towards the perfect management of the sufficing velocity.

Many who have seen the barometer guage at Kingstown rising from zero to fifteen inches in two minutes, by the action of the air-pump at Dalkey, 1¾ mile distant, are inclined to assume that the fixed engines for working such a railway as this might be placed ten or fifteen miles apart. But few, however, have taken the trouble to ascertain what are the conditions on which will depend the distance at which the stationary engines should be placed from each other; and it would probably surprise almost every one to be informed that, if there were no leakage, a stationary engine would draw the same load, and at the same velocity from a distance of six miles, that it would be able to draw from a distance of but one mile. In the former case, indeed, the engine must work six times as long to produce the required vacuum to start the train; but it is manifest that it must also work six times as long whilst the journey is being performed. Now the leakage is proportionate both to the length of the valve and the time taken to exhaust the pipe of the entire of the air it contains; one portion being withdrawn before the train starts, the remainder during the prosecution of the journey. From this it follows, that if it be required to double the distance between the stationary engines, their power need only be increased in the proportion that is necessary to overcome the additional leakage, but that they must be kept at work double the time, both in producing the vacuum and in performing the journey. On the other hand, the number of trains which may be started in a given period will be determined by the distance between the stationary engines, it

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being manifest that a second train cannot start until the first has performed its journey to the next engine, and also that the pipe has been again exhausted. It is thought that in practice a distance of from three to five miles will be found the most convenient.

The leakage being proportionate to the time taken to exhaust the pipe of the air it contains, it follows, as a curious result, that on this system there is little or no economy in working slowly. Every one who is at all acquainted with the locomotive engine is aware of the enormous additional cost at which any increase of speed is attained.

Another unexpected result of the atmospheric system is, that no delay takes place in the time of performing any given journey by making a moderate number of stops for a short time each — such, for instance, as are usual on English railways, when conveying the mails. After the train has overcome its *vis inertiæ*, it will move forward at whatever rate the air in the pipe is being withdrawn by the pump; and although the motion of the train must be retarded in approaching a station, stopped altogether there for a short time, and again only slowly resumed, yet, all this time, the action of the air-pump continues, and the result is, a greater rarefaction in the pipe, which gives a corresponding increased velocity to the train, until the power and the load mutually counterbalance each other.

With respect to the question of expence, it is confidently asserted that, in any moderately difficult country, an atmospheric railway (a single line), provided with all the apparatus necessary on a suitable scale, will not cost more than for a single locomotive line, also prepared with a due allowance of engines for a similar traffic, with the necessary accompaniments of turn tables, coke and water stations, cranes, &c.; but, above all, of workshops, tools, and machinery.

Let us now follow up the comparison.

With the locomotive, the safety of the passengers (on a single line) is admitted to depend on the electric telegraph, any derangement of which, or any mistake or misapprehension of a signal, may result in one of the most fearful calamities human imagination can well conceive — namely, a collision between two trains moving in opposite directions at high velocities. On the atmospheric system, the worst that can happen from any derangement or mistake will be some delay to the passengers.

Again, the locomotive gives us, at considerable cost, a speed of from 25 to 30 miles per hour, with all its inevitable accompanying annoyances, including (on single lines) the abiding apprehension of the consequences of some mistake; whilst, by means of the atmospheric, we have a cheap and rapid flight of 50 to 60 miles per hour; freed from all the inconveniences of the locomotive; but, above all, we shall travel with our minds released from all apprehension of danger, and with the enjoyment which a feeling of security alone can give.

With respect to the cost of working, it appears that the fixed engine at Dalkey, of 100 (commercial) horse power, does not consume more steam than one of the locomotives on the Dublin and Kingstown line, when moving at the rate of 30 miles per hour; and we have seen a calculation which has been attributed to one of the cleverest and most successful men in Ireland, in which he has shown that the combustion of 5lbs. weight of coal, costing one-half-penny, would, on this system, convey a passenger from Dublin to Cork, upwards of 150 miles, allowing six passengers and carriages to the ton!

The inventor and patentees of this new system of locomotion are Messrs. Clegg and Samuda. Mr. Clegg is the same gentleman who has already so distinguished himself by his gas lighting inventions.

PREMIUMS FOR NEW INVENTIONS AND IMPROVEMENTS,

OPEN TO THE COMPETITION OF ALL PERSONS NATIVES OF GREAT BRITAIN AND IRELAND,

Offered by the Royal Cornwall Polytechnic Society.

A PREMIUM of fifty pounds, by the Rev. Canon Rogers, to the superintending engineer who shall have been employed to erect a machine for raising miners from underground in any Cornish mine, and shall have succeeded in erecting such machine to the satisfaction of the adventurers, so as for it to work efficiently not less than three months. The depth from which the miners are raised, to be not less than one hundred fathoms. The offer to continue in force till the 25th March, 1845.

A premium of ten pounds, by the Society, for the best experimental examination of any of the elements of the steam engine, a knowledge of which may indicate the relative value of the different improvements which have been of late made in the engines of Cornwall.

The following are the most desirable points for enquiry: —

1st. An account of the exact quantity of water evaporated by the boilers, in cubic feet, and used in the cylinder.

2d. The quantity of steam cut off at each stroke from the boilers, in cubic feet, and its pressure at the moment of closing the steam valve, and also the pressure in the cylinder at the termination of the stroke.

3d. The exact amount, in feet, of the motion of the acting stroke of the piston, and its variable velocity at different points.

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4th. The quantity and temperature of the injection water, in relation to that delivered, and the best temperature of the injection water in relation to the burthen of the air pumps, and the feed water of the boilers.

Two premiums by the Society of three pounds, and of two pounds, for the two best and most accurate details of any recent luminous or vaporous appearance, or emanations from the earth, in the vicinity of mines or mineral veins.

A premium of ten pounds, by W. T. Praed, Esq., M. P., for the best chemical or mechanical method of ventilating mines, that can be applied to the Cornish mines with advantage.

A premium of ten pounds, by J. H. Tremayne, Esq., for the best available method of improvement, on the plan already adopted at Tresavean, for facilitating the ascent and descent of miners.

A premium of ten pounds, by T. J. A. Robarts, Esq., for the plan, or model, which obtains the above premium, provided it be accompanied by such estimate of expense as shall be approved of by the judges.

A premium of five guineas, by John Taylor, Esq., F. R. S., for the most complete and accurate accounts of the quantity of water supplied to the boilers, the number of bushels of coals consumed, and the duty performed by an engine, for a period of not less than six months.

A premium of ten pounds, by Capt. Jenkins, of Assam, in India, for the best essay on the several descriptions of fishing boats used on the coast of Cornwall, and in the Scilly islands; with particular advertence to their manageableness and capacity, and their good qualities under oar and sail, their adaptation (particularly as to safety) to their respective fisheries; containing also a comparison of our fishing boats with those of any other coasts of Great Britain, or elsewhere, and suggestions for their improvement. To be accompanied by drawings.

A premium of five pounds, by Henry English, Esq., editor of the Mining Journal and Mining Review, for the best paper, containing an account of any methods or plans, practised in any other mining districts, advantageously applicable to the Cornish mines. To be accompanied by the necessary drawings.

A premium of ten pounds, by the Society, and H. English Esq., for the most accurate account of the quantity of water, found at different depths, in the mines of this county, with a view of ascertaining if the quantity of water increases with the depth, or otherwise.

A premium of five pounds, by the Society, for the best design of a detached cottage, or cottages, for the poor, regard being had to the material usual in the mining or rural districts, to the habits of these classes of the population, and to the economy of the construction.

A premium of ten pounds, by the Society, for the best practical method of obviating the corroding effects, produced by solution of copper and other substances in the *feed and injection water* on the boilers, and other parts of the steam engines used in Cornwall.

A premium of seven pounds, by the Society, for the best account of the space passed through by the pistons of any pumping engine in Cornwall (not less than 50-inch cylinder), for a period of six months; together with an account of the space passed through by the piston, as shewn in the published monthly reports and the probable causes of difference.

A premium of three guineas, by Charles Fox, Esq, for the best analysis of air taken at the termination of a "*core*," one from the extremity of a mine level in granite, and the other in killas; the samples to be as fairly taken as possible, and in measure not less than one gallon each; it is desirable that the ends should be at least 15 fathoms from any shaft or winze, not more than 20 fathoms above the deepest level of the mine, nor less than 100 fathoms below the adit. The value of the observations will be much enhanced, if they include the analysis of air taken from ends similarly circumstanced, but into which fresh air is injected.

Four premiums by Charles Fox, Esq., for the best series of instructions for a general and particular examination of every steam-boat engineer, so as to place beyond a doubt the candidate's capability to undertake a charge of such great importance, either on long or short voyages, in fine or stormy weather, and when the boilers and machinery are in order, or when some parts may have sustained injuries, not irremediable at sea, or at least not incompatible with the use of steam during the remainder of the voyage. First premium, seven guineas; second premium, five guineas; third, three guineas; and the fourth, two guineas.

A premium of twenty pounds, by Capt. Jenkins and Messrs. G. C. and R. W. Fox and Co., for the best method of enclosing pilchards in deep water, and securing them in a state fit for curing — such method to be in actual operation.

Offered by the Highland and Agricultural Society of Scotland.

One hundred sovereigns, to be awarded in such proportions as the directors may think proper, for such communications as shall be lodged on any of the following subjects, which may be approved by them: — on the influence of soil on vegetation — on the action and uses of lime — atmospheric influences upon soil and vegetation — saline constituents of plants — mineral substance of weeds — experiments with substances as manures — radical excretions of plants — on the absorption of liquid solutions by timber, and the effects.

The gold medal for the best and ap-

proved report on the hardy, or supposed hardy, agricultural and other useful plants, of the Himalaya, and other parts of India, where such a low temperature exists as to induce the belief that they may be beneficially introduced into the cultivation of Scotland.

A premium of five hundred sovereigns or such other sums as the directors may see proper in the circumstances, for the first successful application of steam-power to the cultivation of the soil.

LIFE-ASSURANCE.

LIFE-ASSURANCE business is transacted by trading companies established for that special purpose; and the greater proportion of these consist of a body of proprietors, residing in different parts of the kingdom, and possessing capital as a guarantee for their stability, varying in amount from 50,000*l.* or 100,000*l.*, to 1,000,000*l.* In some instances there is no subscribed capital; all the persons assuring in the company being members, or partners, and mutual assurers of each other's lives.

Transactions involving such extraordinary obligations as those connected with life-assurance, extending so far into futurity, and affecting the interests of generations yet unborn, could not be so safely or so appropriately undertaken by private individuals, on their own responsibility, as by a certain number of such persons in an associated capacity. Companies can carry on their business in perpetuity, upon established principles, and without being subject to reverses, interruptions, changes of purpose, or fluctuation of capital, such as necessarily attend the very best-conducted establishments of private tradesmen.

The benefits of life-assurance were not sufficiently appreciated as to attract particular attention until within the last twenty-five or thirty years; since which period the business has very rapidly increased. At the present moment there is probably upwards of one hundred of what are termed LIFE-ASSURANCE OFFICES in Great Britain, and an equal, if not greater, proportion in the various countries on the Continent of Europe, and in America.

The principal part of British assurance offices are in the metropolis; but they extend their influence throughout the whole empire by means of advertisements, and carry on their operations through the efforts of local residents in every town, who act as agents.

The following is a summary of the conditions which must be complied with by every person who wishes to effect an assurance on his life.

An office having been selected, if the person reside in London, application must be made to the secretary, if in the country, to the agent, who will supply a printed form termed a proposal, and give the necessary instructions as to the proper mode of filling it up.

This form will require an accurate account to be written thereon, of the name, occupation, residence, place of birth, age, habits of life, and past and present state of health of the person on whose behalf the proposal is made. It will also require the name, occupation, and residence of one or more private friends of the proposer, who are sufficiently acquainted with him as to be able to give satisfactory replies respecting his habits, appearance, and general health. It will further require the name and residence of the proposer's usual medical attendant. These several matters being authenticated by the signature of the person to whom they relate, the form is returned to the office, the necessary inquiries are instituted, and the individual is then examined, on behalf of the company, by a physician or surgeon resident in the same town as himself.

Every statement made to the office by the proposer himself, his private friends, and his medical attendant, should be in good faith. The affair must not be treated as one of mere formality; but there should be a scrupulous regard to truth, avoiding precipitancy on the one hand, and concealment on the other. The necessity for this will hereafter appear.

If, after due examination and inquiry, the proposal be accepted, a notice to that effect will be sent to the applicant, who will at the same time be informed of the amount of premium and stamp-duty (the latter payable only the first year), which, being paid within a specified period, a policy of assurance will be issued, and the contract on both sides be completed.

In every policy there is a special reference to the truth of the statements made by the person assured; and such are the express conditions on which the validity of the contract depends. If it should subsequently appear that any fraudulent statement was knowingly made by the assurer, or by others on his behalf, it would, in the event of his premature death, occasion disputes, if not serious loss, to the survivors.

Such are the forms of proceeding in effecting an assurance on a person's own life. It may be right, however, to mention that the forms are not precisely alike in any two offices, although the principle is the same in all.

Very few of the offices will accept proposals relating to any other than what are termed unexceptionable lives, that is, where there is, apparently, no constitutional infirmity or liability to disease. There are numberless instances, however, where persons possess, from childhood, an enfeebled constitution; others have an hereditary predisposition to disease; whilst others suffer from congenital or accidental deformity, the effects of climate, or derangements of particular functions, which cause serious inconvenience without mate-

rially endangering life. In these, and many similar cases, where persons are always ailing, but are never seriously ill, they frequently outlive their more healthful and vigorous contemporaries.

Whilst it would be a great hardship to exclude the class of persons just referred to from the benefits of life-assurance, there exists no necessity for doing so; the statistics of malformation and of disease affording data equally safe for assuring the lives of persons labouring under almost every imaginable malady as of those in perfect health. There are offices which, in addition to their ordinary business, undertake risks of this kind. In such cases the premiums vary according to the peculiar circumstances in each individual case, and they are always higher than those set forth in the published tables.

Hitherto the case only has been considered of a person assuring his own life: but there are other sorts of assurances equally useful. It is possible to assure on the life of others, provided there be a pecuniary interest, present or prospective, dependent on their living and co-extensive with the sum assured. Cases of this kind are common; as where property is held by a life tenure, where the receipt of an annual income depends on the life of an individual, or where the expectancy of property is limited by the contingency that one person shall outlive another. A person may also assure a sum on his own life, receivable on his attaining a certain specified age, or, should he die before that period, to be paid to his family.

An assurance having been completed, though the assured die on the following day, the benefits thereby secured are equally available to those for whom they are intended, as they would be after the lapse of any number of years.—*Advantages of Life Assurance*, by J. O. N. Rutter, F.R.A.S.

RATES OF POSTAGE.

All letters from one part of Great Britain to another (including the Local Penny Posts and the London Twopenny Post), are charged by weight as follows, if prepaid: —

Not exceeding ½ an ounce . . . . . 1*d.*
Exceeding . . ½ an ounce, and not exceeding 1 ounce . 2*d.*
——— 1 ounce ——— ——— 2 ounces, 4*d.*
——— 2 ounces, ——— ——— 3 ounces, 6*d.*

and so on at the rate of 2*d.* for every additional oz. or fraction of an oz.

Unpaid and unstamped letters, are charged double postage on delivery; letters insufficiently paid or stamped are charged double the amount of such insufficiency on delivery.

Letters or packets exceeding 16 oz. in weight not forwarded — *except*,

Parliamentary petitions and addresses to Her Majesty,
Parliamentary proceedings,
Letters or packets addressed to, or received from, places beyond sea,
Letters or packets to and from public departments, and public officers heretofore franking by virtue of their office.

RECEIPT AND BILL STAMPS.

	£	s.	d.
Receipts for £5 and under £10	0	0	3
..... 10 20	0	0	6
..... 20 50	0	1	0
..... 50 100	0	1	6
..... 100 200	0	2	6
..... 200 300	0	4	0
..... 300 500	0	5	0
..... 500 1000	0	7	6
..... 1000 or upwards	0	10	0
Receipts in full of all demands	0	10	0

Bills and Promissory notes, not exceeding two months after date, or sixty days after sight.

									For a longer period.		
If	£5	5		£20	0	£0	1	6	£0	2	0
Above	20	0		30	0	0	2	0	0	2	6
Above	30	0		50	0	0	2	6	0	3	6
Above	50	0		100	0	0	3	6	0	4	6
Above	100	0	and not	200	0	0	4	6	0	5	0
Above	200	0	exceeding	300	0	0	5	0	0	6	0
Above	300	0		500	0	0	6	0	0	8	6
Above	500	0		1000	0	0	8	6	0	12	6
Above	1000	0		2000	0	0	12	6	0	15	0
Above	2000	0		3000	0	0	15	0	1	5	0
Above	3000	0				1	5	0	1	10	0

*** Bills of exchange, accepted upon protest for honour, coming due on Sunday, Christmas Day, or Good Friday, are not payable till the day *after*, and not the day *before*, as was heretofore the case.

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ROYAL FAMILY OF GREAT BRITAIN.

THE QUEEN.—VICTORIA, (daughter of the Duke of Kent, fourth son of George III.) *born*, 24 May, 1819; succeeded to the throne, 20 June, 1837; *married*, His Royal Highness Prince Albert of Saxe Coburg and Gotha, 10 Feb. 1840.

QUEEN DOWAGER.—Amelia Adelaide Louisa Theresa, widow of William IV., and sister to the reigning Duke of Saxe Meiningen, *born*, 13 Aug. 1792; *married*, 11 July 1818; crowned, 8 Sept. 1831.

His Royal Highness Francis Albert Augustus Charles Emanuel, Duke of Saxe, Prince of Coburg and Gotha, K G., Consort of Her Majesty, *b.* 26 Aug. 1819.

Victoria Adelaide Mary Louisa, PRINCESS ROYAL, *b.* 21 Nov. 1840.

Albert Edward, PRINCE OF WALES and DUKE OF CORNWALL, *b.* Nov. 9. 1841.

Alice Maud Mary, *b.* 5 April, 1843.

Ernest Augustus, King of Hanover, DUKE OF CUMBERLAND and TEVIOTDALE, uncle to her Majesty, *b.* 5 June, 1771; *m.* 29 Aug. 1815. Issue, George Frederick.

Adolphus Frederick, DUKE OF CAMBRIDGE, uncle to her Majesty, *b.* 24 Feb. 1774; *m.* 7 May, 1818. Issue, George William, Augusta Caroline, and Mary Adelaide.

MARY, aunt to her Majesty, *b.* 25 April, 1776; *m.* 22 July, 1816, her cousin, the Duke of Gloucester, *dec.*

SOPHIA, aunt to her Majesty, *b.* 3 Nov. 1777.

Victoria Mary Louisa, DUCHESS OF KENT, mother of the Queen, *b.* 17 Aug. 1786; *m.* in 1818 the Duke of Kent, who *d.* 23 Jan. 1820.

Augusta Wilhelmina Louisa, DUCHESS OF CAMBRIDGE, niece of the Landgrave of Hesse, *b.* 25 July, 1797; *m.* in 1818 the Duke of Cambridge, by whom she has issue.

SOPHIA MATILDA OF GLOUCESTER, second cousin to her Majesty, *b.* 29 May, 1773.

George Frederick Alex. Ernest Augustus, only child of the King of Hanover, *b.* 27 May, 1819; *m.* 18 Feb. 1843, Princess Mary of Saxe Altenberg.

George William Frederick Charles, son of the Duke of Cambridge, *b.* 26 March, 1819.

Augusta Caroline Charlotte Elizabeth Mary Sophia Louisa, daughter of the Duke of Cambridge, *b.* 19 July 1822; *m.* 28 June, 1843, Frederick, Hered. Grand Duke of Mecklenberg Strelitz.

Mary Adelaide Wilhelmina Eliz., daughter of the Duke of Camb., *b.* 27 Nov. 1833.

HER MAJESTY'S CABINET MINISTERS.

First Lord of the Treasury (Prime Minister), Rt. Hon. Sir Robert Peel.
Lord High Chancellor, Lord Lyndhurst.
Chancellor of the Exchequer, Rt. Hon. Henry Goulburn.
Pres. of the Council, Lord Wharncliffe.
Lord Privy Seal, Duke of Buccleuch.
Secretary of State for Home Depart., Right Hon. Sir James Graham, Bart.
Sec. for Foreign Aff., Earl of Aberdeen.
Secretary for the Colonies, Lord Stanley.
First Lord of the Admiralty, Earl of Haddington.
Commander in Chief, The Duke of Wellington.
President Board of Control, Earl of Ripon.
Pres. of the Board of Trade, and Master of the Mint, Rt. Hon. W. E. Gladstone.
Sec. at War, Rt. Hon. Sir Henry Hardinge.
Paymaster-General, Right Hon. Sir Edward Knatchbull, Bart.

CHIEF OFFICERS OF STATE NOT OF THE CABINET.

First Commissioner of Woods and Forests, Earl of Lincoln.
Chanc. Duchy Lanc., Lord Gran Somerset.
Lord Lieuten. of Ireland, Earl de Grey.
Chief Secretary for Ireland, Lord Eliot.
Lord Chancellor of Ireland, Sir Edward Sugden.
Postmaster-General, Lord Lowther.
Master-Gen. of Ordnance, Sir G. Murray.
Gov.-Gen. of India, Lord Ellenborough.
Governor-General of North American Provinces, Rt. Hon. Sir C. Theo. Metcalfe.
Lord Great Chamb., Lord W. D'Eresby.
Lord Cham. of the Household, Earl Delawar.
Lord Steward, Earl of Liverpool.
Master of the Horse, Earl of Jersey.
Earl Marshal, Duke of Norfolk.
Attorney-General, Sir Frederick Pollock.
Solicitor-General, Sir William Follett.
Judge-Advocate, Rt. Hon. J Nicoll, D.C.L.

COURTS OF LAW.

COURT OF CHANCERY.

Lord Chancellor, Lord Lyndhurst.
Master of the Rolls, Lord Langdale.
Vice-Chan. of England, Sir L. Shadwell.
Vice-Chancellors, Sir J. L. Knight Bruce. and Sir James Wigram.

COURT OF QUEEN'S BENCH.

Lord Chief Justice, Lord Denman.
Judges, Sir John Patteson. Sir J. Williams. Sir J. T. Coleridge. Sir W. Wightman.

COURT OF COMMON PLEAS.

Ch Justice, Sir Nicolas Conyngham Tindal.
Judges, Sir John Coltman. Right Hon. Sir Thos. Erskine. Sir W. H. Maule. Sir Cresswell Cresswell.

COURT OF EXCHEQUER.

Lord Chief Baron, Lord Abinger.
Barons, Sir J. Gurney. Sir J. Parke. Sir E. H. Alderson. Sir R. M. Rolfe.
Cursitor Baron, George Bankes, Esq.

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HOUSE OF LORDS.

[The Peers are inserted in the order of their precedence, which is regulated by the dates of their respective elevations, to the highest rank, which they hold in the English Peerage.]

Speaker— Right Hon. Lord Lyndhurst, Lord High Chancellor.

PEERS OF THE BLOOD ROYAL, 2.

	Created.
Ernest Augustus, Duke of Cumberland and Teviotdale (King of Hanover)	1799
Adolphus Frederick, Duke of Cambridge.....	1801

DUKES, 20.

Norfolk.	St. Albans.	Rutland.	Newcastle.	Buckingham and Chandos.
Somerset.	Leeds.	Brandon (*Hamilton*).	Northumberland.	Sutherland.
Richmond.	Bedford.	Portland.	Wellington.	Cleveland.
Grafton.	Devonshire.	Manchester.		
Beaufort.	Marlborough.			

MARQUESSES, 20.

Winchester.	Bath.	Exeter.	Cholmondeley.	Ailsa.
Lansdowne.	Abercorn.	Northampton.	Hastings.	Breadalbane.
Townshend.	Hertford.	Camden.	Ailesbury.	Westminster.
Salisbury.	Bute.	Anglesey.	Bristol.	Normanby.

EARLS, 116.

Shrewsbury.	Plymouth.	Fitzwilliam.	Rosslyn.	Somers.
Derby.	Scarborough.	Egremont.	Craven.	Stradbroke.
Huntingdon.	Albemarle.	Guildford.	Onslow.	Vane (*Londonderry*).
Pembroke and Montgomery.	Coventry.	Cornwallis.	Romney.	Amherst.
Devon.	Jersey.	Hardwicke.	Chichester.	Cawdor.
Suffolk & Berks.	Poulett.	Delawar.	Wilton.	Munster.
Denbigh (*Desmond*).	Oxford and Mortimer.	Radnor.	Powis.	Burlington.
Westmoreland.	Ferrers.	Spencer.	Nelson.	Camperdown.
Lindsey	Dartmouth.	Bathurst.	Manvers.	Lichfield.
Stamford and Warrington.	Tankerville.	Hillsborough (*Downshire*).	Orford.	Durham
Winchelsea and Nottingham.	Aylesford.	Clarendon.	Lonsdale.	Ripon.
Chesterfield.	Cowper.	Abergavenny.	Harrowby.	Granville.
Thanet.	Stanhope.	Talbot.	Harewood.	Howard of Effingham
Sandwich.	Harborough.	Strange (*Athol*).	Minto.	Ducie.
Essex.	Macclesfield.	Mount Edgecumbe.	Cathcart.	Yarborough.
Cardigan.	Pomfret.	Fortescue.	Verulam.	Leicester.
Carlisle.	Graham (*Montrose*).	Digby.	Brownlow.	Innes (*Roxburgh*).
Doncaster (*Buccleuch*).	Waldegrave.	Beverley.	St. Germains.	Lovelace.
Shaftesbury.	Ashburnham.	Mansfield.	Morley.	Zetland.
Berkeley.	Harrington.	Carnarven.	Bradford.	Auckland (*Eden*).
Abingdon.	Portsmouth.	Liverpool.	Beauchamp.	Gainsborough.
	Brooke and Warwick.	Cadogan.	De Grey.	Fitzharding.
	Buckinghamsh.	Malmesbury.	Eldon.	
			Falmouth.	
			Howe.	

VISCOUNTS, 21.

Hereford.	Maynard.	Sidmouth.	Hutchinson—*Donoughmore*.	Canning.
Bolingbroke & St. John.	Sydney.	Lake.	Beresford.	Canterbury.
Torrington.	Hood.	Gordon—*Aberdeen*.	Clancarty.	Ponsonby of Imokilly.
Leinster.	St. Vincent.	Exmouth.	Combermere.	Hill.
	Melville.			

BARONS, 213.

De Ros.	Berners.	St. John of Bletsoe.	Clifton (Darnley).	Boyle (Cork and Orrery).
Audley.	Willoughby de Broke.	Howard de Walden.	Dormer.	Hay (Kinnoul).
Clinton.	Vaux of Harrowden.	Grey of Groby.	Teynham.	Middleton.
Dacre.	Paget (E. of Uxbridge).	Saye and Sele.	Stafford.	Monson.
Willoughby d'Eresby.		Petre.	Byron.	Montford.
Camoys.		Arundel.	Ward.	Bruce.
Stourton.			Clifford of Chudley.	

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Ponsonby (Besborough).
Sondes.
Scarsdale.
Boston.
Holland.
Lovell (Egmont)
Vernon.
Sundridge and Hamilton (Argyll).
Hawke.
Foley.
Dynevor.
Walsingham.
Bagot.
Southampton.
Grantley.
Rodney.
Carteret.
Berwick.
Sherborne.
Montagu.
Tyrone (Waterford).
Carleton (Shannon).
Suffield.
Dorchester.
Kenyon.
Braybrooke.
Fisherwick (Donegal).
Douglas.
Gage.
Thurlow.
Lyttleton.
Mendip and Dover.
Stuart (Moray).
Stewart of Garlies (Galloway).
Saltersford (Courtown).
Brodrick (Middleton).

Calthorpe.
Dunstanville.
Carrington.
Bayning.
Bolton.
Wodehouse.
Northwick.
Lilford.
Ribblesdale.
Fitz-Gibbon (Clare).
Moore (Drogheda).
Loftus (Ely).
Carysfort.
Alvanley.
Abercromby.
Rivers.
Redesdale.
Ellenborough.
Sandys.
Arden.
Rendlesham.
Erskine.
Monteagle (Sligo).
Ardrossan (Eglinton).
Lauderdale.
Granard.
Crewe.
Gardner.
Manners.
Hopetown and Niddry.
Lynedoch.
Daihousie.
Meldrum (Aboyne).
Ross (Glasgow).
Grinstead (Enniskillen).
Foxford (Limerick).
Churchill.
Melbourne.

Harris.
Prudhoe.
Colchester.
Kerr (Lothian).
Minster (Conyngham).
Ormonde.
Wemyss.
Clanbrassil (Roden).
Kingston.
Silchester (Longford).
Glenlyon.
Maryborough.
Oriel (Ferrard).
Ravensworth.
Delamere.
Forester.
Rayleigh.
Bexley.
Gifford.
Penshurst (Strangford).
Tadcaster (Thomond).
Somerhill (Clanricarde).
Wigan (Balcarras).
Ranfurly.
De Tabley.
Wharncliffe.
Feversham.
Seaford.
Fitzgerald and Vesci.
Lyndhurst.
Fife.
Tenterden.
Plunkett.
Melrose (Haddington).
Cowley.
Stuart de Rothsay.

Heytesbury.
Roseberry.
Clanwilliam.
Skelmersdale.
Wallace.
Wynford.
Brougham and Vaux.
Kilmarnock (Errol).
Fingall.
Sefton.
Clements (Leitrim).
Rossie (Kinnaird).
Dunmore.
Hamilton (Belhaven).
Howden.
Panmure.
Poltimore.
Kenlis (Headfort).
Chaworth (Meath).
Mostyn.
Templemore.
Dinorben.
Cloncurry.
De Saumarez.
Godolphin.
Hunsdon (Falkland).
Western.
Denman.
Duncannon.
Fitzgerald and Desmond.
Abinger.
De L'Isle and Dudley.
Ashburton.
Glenelg.
Hatherton.
Strafford.

Warlingham (Gosford).
Cottenham.
Langdale.
Portman.
Lovat.
Bateman.
Charlemont.
Kintore.
Lismore.
Carew.
De Mawley.
Wrottesley.
Sudeley.
Methuen.
Bruce.
Beauvale.
Furnival (Talbot de Malahide).
Stuart de Decies
Leigh.
Wenlock.
Lurgan.
Colborne.
De Freyne.
Dunfermlin.
Monteagle (Rice).
Seaton.
Keane.
Beaumont (Stapleton) *Rev.*
Hastings (Astley) *Rev.*
Ennishowen and Carrickfergus.
Kenmare.
Oxenford.
Surrey.
Campbell.
Congleton.
Lowther.
Vivian.

ARCHBISHOPS AND BISHOPS, 26.

	Cons.	*Trs.*
Dr. William Howley, Lord Archbishop of Canterbury	1813	1828
Hon. Dr. Ed. Vernon Harcourt, Lord Archbishop of York	1791	1801

Right Hon. Dr. Charles James Blomfield	London.	Dr. James Henry Monk	Gloucester and Bristol.
Dr. Edward Maltby	Durham.	Dr. Joseph Allen	Ely.
Dr. Charles Richard Sumner	Winchester.	Dr. Charles Thomas Longley	Ripon.
Dr. George Henry Law	Bath and Wells.	Dr. E. Denison	Salisbury.
Dr. John Kaye	Lincoln.	Dr. Edward Stanley	Norwich.
Dr. William Carey	St. Asaph.*	Dr. Thomas Musgrave	Hereford.
Dr. Christopher Bethell	Bangor.*	Dr. George Davys	Peterborough.
Dr. George Murray	Rochester.	Dr. Connop Thirlwall	St. David's.
Hon. Dr. Hugh Percy	Carlisle.	Dr. Henry Pepys	Worcester.
Dr. Edward Copleston	Llandaff.	Dr. A. T. Gilbert	Chichester.
Dr. John Bird Sumner	Chester.	Dr. John Lonsdale	Lichfield and Coventry.
Dr. Richard Bagot	Oxford.	Dr. Thos. V. Short (not a Peer)	Sodor and Man.
Dr. Henry Phillpotts	Exeter.		

* St. Asaph and Bangor are, on the next vacancy in either See, to be united.

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IRISH REPRESENTATIVE PRELATES, 4.

Archbishop of Armagh, and Bishops of Kilmore, Clogher, and Killaloe.

REPRESENTATIVE PEERS.

FOR SCOTLAND, 16. — ELECTED AT THE COMMENCEMENT OF EACH PARLIAMENT.

Titles.	*Titles.*	*Titles.*
Marq. Tweeddale.	Earl Orkney.	Baron Sinclair.
Earl Morton.	Viscount Arbuthnot.	Baron Colville of Culross.
Earl Seafield.	Viscount Strathallan.	Lord Reay.
Earl Airlie.	Baron Saltoun and Abernethy.	Lord Rollo.
Earl Leven & Melville.	Baron Polwarth.	(One vacant.)
Earl Selkirk.		

FOR IRELAND, 28. — ELECTED FOR LIFE.

Titles.	*Titles.*	*Titles.*
Marq. Thomond.	Earl Limerick. (Foxford.)	Baron Dunsany — *Plunket.*
Marq. Westmeath	Earl Charleville.	Baron Blaney.
Earl Caledon.	Earl of Gosford.	Baron Carbery — *Freke.*
Earl Mountcashel.	Earl Glengall.	Baron Clonbrock — *Dillon.*
Earl Doneraile.	Vt. Lorton—*King.*	Baron Crofton.
Earl Mayo.	Vt. Gort—*Vereker.*	Baron Farnham.
Earl Wicklow.	Viscount Hawarden — *Maude.*	Baron Dunally — *Prittie.*
Earl of Dunraven.	Visct. de Vesci.	Baron Castlemaine.
Earl of Lucan.		Baron Downes—*Burgh.*
Earl of Bandon.		(One vacant.)

HOUSE OF COMMONS. — ELECTED AUGUST, 1841.

(FOURTH REFORMED HOUSE.)

Speaker — Right Hon. Charles Shaw Lefevre.

ENGLAND AND WALES.

For Counties, 159; Universities, 4; Cities and Boroughs, 337 — Total, 500.

Abingdon, T. Duffield.
Albans, St., G. W. Repton, Earl of Listowel.
Andover, R. Etwall, Lord W. Paget.
Angleseyshire, Hon. W. O. Stanley.
Arundel, Earl of Surrey.
Ashburton, J. Matheson
Ashton-under-Lyne, C. Hindley.
Aylesbury, C. J. B. Hamilton, R. R. Clayton.
Banbury, H. W Tancred.
Barnstaple, F. Hodgson, Montague Gore.
Bassetlaw, Hon. A. Duncombe, G. H. Vernon.
Bath, Visct. Duncan, J. A. Roebuck.
Beaumaris, &c., Captain F. Paget.
Bedfordshire, Lord Alford, W. Astell.
Bedford, Capt. Polhill, H. Stuart.
Berkshire, R. Palmer, Lord Barrington, P. Pusey.
Berwick-on-Tweed, Richard Hodgson, M. Forster.
Beverley, J. W. Hogg, J. Towneley.
Bewdley, Sir T. E. Winnington, Bart.
Birmingham, J. Scholefield, G. F. Muntz.
Blackburn, W. Feilden, J. Hornby.
Bodmin, J. Dunn Gardner, Sir S. T. Spry.
Bolton, P. Ainsworth, Dr. J. Bowring.
Boston, Sir J. Duke, J. S. Brownrigg.
Bradford, W. Busfield, sen., J. Hardy.
Breconshire, Col. T. Wood.
Brecon, C. M. R. Morgan.
Bridgenorth, T. C. Whitmore, Sir Robert Pigot, Bart.
Bridgewater, H. Broadwood, T. S. Forman.
Bridport, A. D. Cochrane, T. A. Mitchell.
Brighton, Capt. Pechell, Lord A. Hervey.
Bristol, P. W. Miles, Hon. F. Berkeley.
Buckinghamshire, Hon. W. E. Fitzmaurice, Col. Geo. Du Pré, C. R. S. Murray.
Buckingham, Sir T. Fremantle, Sir J. Chetwode, Bart.
Bury, R. Walker.
Bury St. Edmunds, Lord Charles Fitzroy, Earl Jermyn.
Calne, Earl of Shelburn.
Cambridgeshire, E. T. Yorke, R. J. Eaton, P. Allix.
Cambridge University, Rt. Hon. H. Goulburn, Hon. C. E. Law.
Cambridge, Fitzroy Kelly, Hon. J. H. Manners Sutton.
Canterbury, J. Bradshaw, Hon. G. P. S. Smythe.
Cardiff, &c., Right Hon. J. Nicoll. D.C.L.
Cardiganshire, Col. W. E. Powell.
Cardigan, &c., Pryse Pryse.

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Carlisle, P. H. Howard, W. Marshall.
Carmarthensh., Col. Rice Trevor, D. A. S. Davies.
Carmarthen, D. Morris.
Carnarvonshire, Hon. E. G. Pennant.
Carnarvon, W. B. Hughes.
Chatham, Rt. Hon. Capt. Byng.
Cheltenham, Captain C. F. Berkeley.
Cheshire (N.), W. T. Egerton, G. C. Legh.
Cheshire (S.), Sir P. Grey Egerton, J. Tollemache.
Chester, Lord R. Grosvenor, John Jervis.
Chichester, J. A. Smith, Lord Arthur Lennox.
Chippenham, Jos. Neeld, Rt. Hon. H. G. Boldero.
Christchurch, Right Hon. Sir George Rose.
Cirencester, W. Cripps, Colonel Master.
Clitheroe, E. Cardwell.
Cockermouth, H. A. Aglionby, Edward Horsman.
Colchester, R. Sanderson, Sir G. H. Smyth.
Cornwall (E.), Lord Eliot, W. Rashleigh.
Cornwall (W.), E. W. W. Pendarves, Sir C. Lemon, Bart.
Coventry, Rt. Hon. Edward Ellice, W. Williams.
Cricklade, John Neeld, Hon. H. Howard.
Cumberland (E.), Hon. C. Howard, W. James.
Cumberland (W.), E. Stanley, S. Irton.
Dartmouth, Sir John Seale, Bart.
Denbighshire, Hon. W. Bagot, Sir W. Wynn, Bart.
Denbigh, T. Mainwaring.
Derbyshire (N.), Hon. G. H. Cavendish, W. Evans.
Derbyshire (S.), E. M. Mundy, C. R. Colville.
Derby, Edward Strutt, Hon. J. B. Ponsonby.
Devizes, G. H. W. Heneage, T. H. S. Sotheron.
Devonport, Sir G. Grey, Bart., Henry Tuffnell.
Devonshire (N.), Will. Buck, Sir T. Dyke Acland.
Devonshire (S.), Sir J. Y. Buller, Bart., Visct. Courtenay.
Dorchester, Hon. A. H. Ashley Cooper, Rt. Hon. Sir J. Graham.
Dorsetshire, Lord Ashley, H. C. Sturt, G. Bankes.
Dover, Hon. E. Rice, Sir J. R. Reid.
Droitwich, J. S. Pakington.
Dudley, T. Hawkes.
Durham (N.), H. Lambton, Hon. H. T. Liddell.
Durham (S.), Lord H. Vane, J. Bowes.
Durham City, T. C. Granger, J. Bright.
Essex (N.), Sir J. T. Tyrell, Bart., C. G. Round.
Essex (S.), T. W. Bramston, G. Palmer.
Evesham, Lord A. M. C. Hill, P. Borthwick.
Exeter, E. Divett, Sir W. W. Follett.
Eye, Sir E. Kerrison, Bart.
Falmouth and Penryn, J. C. W. Vivian, J. H. Plumridge.
Finsbury, T. Wakley, T. S. Duncombe.
Flintshire, Sir G. S. R. Glynn, Bart.
Flint, &c., Sir R. B. W. Bulkeley, Bart.
Frome, T. Sheppard.
Gateshead, W. Hutt.
Glamorganshire, Lord Adare, C. M. R. Talbot.
Gloucestershire (E.), Hon. C. W. Codrington, F. Charteris.
Gloucestershire (W.), Hon. Grantley Berkeley, R. B. Hale.
Gloucester, J. Phillpotts, Hon. M. F. Berkeley.
Grantham, G. E. Welby, Hon. F. Tollemache.
Great Grimsby, E. Heneage.
Greenwich, E. G. Barnard, J. W. D. Dundas.
Guildford, C. B. Wall, R. D. Mangles.
Halifax, E. Protheroe, Charles Wood.
Hampshire (N.), Sir W. Heathcote, Rt. Hon. C. S. Lefevre.
Hampshire (S.), Lord C. Wellesley, H. C. Compton.
Harwich, T. Attwood, W. Beresford.
Hastings, Rt. Hon. J. Planta, R. Hollond.
Haverfordwest, &c., Sir R. B. Phillips, Bt.
Helston, Sir R. R. Vyvyan.
Herefordshire, K. Hoskins, T. B. Baskerville, J. Bailey.
Hereford, E. B. Clive, Rob. Pulsford.
Hertfordshire, Lord Grimston, A. Smith, Hon. H. D. Ryder.
Hertford, Hon. W. F. Cowper, Lord Mahon.
Honiton, Col. Baillie, F. A. MacGeachy.
Horsham, Hon. R. C. Scarlett.
Huddersfield, W. R. Stansfield.
Hull, Sir W. James, Sir T. Hanmer.
Huntingdonshire, E. Fellowes, G. Thornhill.
Huntingdon, Col. Peel, Sir F. Pollock.
Hythe, S. Marjoribanks.
Ipswich, J. N. Gladstone, S. Lane Fox.
Ives, St., W. T. Praed.
Kendal, H. Warburton.
Kent (East), Sir E. Knatchbull, J. P. Plumptre.
Kent (West), Sir E. Filmer, Visct. Marsham.
Kidderminster, R. Godson.
King's Lynn, Lord G. Bentinck, Viscount Jocelyn.
Knaresborough, A. Lawson, W. B. Ferrand.
Lambeth, Benjamin Hawes, Rt. Hon. C. T. D'Eyncourt.
Lancashire (N.), Lord Stanley, J. W. Patten.
Lancashire (S.), Lord F. Egerton, R. B. Wilbraham.
Lancaster, T. Greene, G. R. Marton.
Launceston, Rt. Hn. Sir Henry Hardinge.
Leeds, W. Beckett, W. Aldam.
Leicestershire (N.), Lord C. S. Manners, E. B. Farnham.
Leicestershire (S.), H. Halford, C. W. Packe.
Leicester, Wynn Ellis, Sir J. Easthope, Bt.
Leominster, C. Greenaway, G. Arkwright.
Lewes, H. Elphinstone, Hon. H. Fitzroy.
Lichfield, Lord A. Paget, Lord Leveson.
Lincoln (Kesteven), C. Turner, Sir J. Trollope, Bart.

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Lincoln (Lindsey), Lord Worsley, R. A. Christopher.
Lincoln, Col. Sibthorp, W. R. Collett.
Liskeard, C. Buller.
Liverpool, Lord Sandon, Sir H. Douglas, Bart.
London, J. Masterman, G. Lyall, Lord John Russell, J. Pattison.
Ludlow, B. Botfield, J. Ackers.
Lyme Regis, T. Hussey.
Lymington, W. A. Mackinnon, J. Stewart.
Macclesfield, J. Brocklehurst, T. Grimsditch.
Maidstone, A. J. B. Hope, G. Dodd.
Maldon, Quintin Dick, J. Round.
Malmesbury, Hon. J. K. Howard.
Malton, J. W. Childers, J. E. Denison.
Manchester, Mark Philips, J. M. Gibson.
Marlboro', Lord E. Bruce, H. B. Baring.
Marlow (Great), R. Hampden, T. P. Williams.
Marylebone, Sir B. Hall, Sir C. N. Napier.
Merionethshire, R. Richards.
Merthyr Tydvil, Sir J. J. Guest, Bart.
Middlesex, G. Byng, T. Wood, jun.
Midhurst, Sir H. B. Seymour, Bart.
Monmouthshire, Lord G. Somerset, C. O. Morgan.
Monmouth, R. J. Blewitt.
Montgomeryshire, Right Hon. C. W. W. Wynne.
Montgomery, Hon. H. Cholmondeley.
Morpeth, Captain Howard.
Newark-upon-Trent, Rt. Hon. W. E. Gladstone, Lord J. Manners.
Newcastle-under-Line, E. Buckley, J. C. Colquhoun.
Newcastle-upon-Tyne, W. Ord, J. H. Hinde.
Newport, Isle of Wight, C. W. Martin, W. J. Hamilton.
Norfolk (E.), E. Wodehouse, H. N. Burroughes.
Norfolk (W.), W. Bagge, W. L. Chute.
Northallerton, W. B. Wrightson.
Northampton (N.), T. P. Maunsell, A. Stafford O'Brien.
Northampton (S.), Sir C. Knightley, Bt., W. R. Cartwright.
Northampton, R. V. Smith, R. Currie.
Northumberland (N.), Lord Ossulston, A. J. Cresswell.
Northumberl. (S.), M. Bell, S. C. H. Ogle.
Norwich, Marquess of Douro, B. Smith.
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Nottinghamshire (N.W.), T. Houldsworth, H. G. Knight.
Nottingham, Sir J. C. Hobhouse, Bart., T. Gisborne, jun.
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Oxford City, D. Maclean, J. H. Langston.
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Pembroke, Sir John Owen, Bart.
Penryn. See Falmouth.
Peterborough, Hon. G. W. Fitzwilliam, Sir R. Heron.
Petersfield, Sir W. G. H. Jolliffe, Bart.
Plymouth, J. Gill, Visc. Ebrington.
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Radnor, Richard Price.
Reading, C. Russell, Visc. Chelsea.
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Richmond, Hon. J. C. Dundas, Hon. W. N. Colborne.
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Rutlandshire, G. J. Heathcote, Hon. H. Dawnay.
Rye, H. B. Curteis.
Salford, J. Brotherton.
Salisbury, A. Hussey.
Sandwich, Sir T. Troubridge, H. H. Lindsay.
Scarborough, Sir F. W. Trench, Sir J. V. B. Johnstone.
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Sheffield, John Parker, H. G. Ward.
Shoreham, H. D. Goring, Sir C. M. Burrell.
Shrewsbury, G. Tomline, B. D'Israeli.
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Shropshire (South), Viscount Newport, Hon. R. H. Clive.
Somersetsh. (E.), Col. Langton, W. Miles.
Somersetshire (W.), T. D. Acland, F. H. Dickinson.
Southampton, Hon. St. John Mildmay, G. W. Hope.
South Shields, J. T. Wawn.
Southwark, John Humphery, Benjamin Wood.
Staffordshire (N.), J. D. W. Russell, C. B. Adderley.
Staffordshire (S.), Col. Anson, Lord Ingestre.
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Stockport, H. Marsland, R. Cobden.
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Stroud, G. P. Scrope, W. H. Stanton.
Sudbury (vacant).
Suffolk (East), Lord Henniker, Lord Rendlesham.
Suffolk (West), Colonel Rushbrooke, H. S. Waddington.
Sunderland, Visc. Howick, D. Barclay.
Surrey (East), H. Kemble, E. Antrobus.
Surrey (West), W. J. Denison, J. Trotter.
Sussex (East), G. Darby, A. E. Fuller.
Sussex (West), Earl of March, C. Wyndham.
Swansea, J. H. Vivian.
Tamworth, Rt. Hon. Sir R. Peel, Captain A'Court.

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Taunton, Rt. Hon. H. Labouchere, Sir T. E. Colebrooke.
Tavistock, J. S. Trelawny, Lord Edward Russell.
Tewkesbury, W. Dowdeswell, J. Martin.
Thetford, Hon. W. B. Baring, Sir J. Flower, Bart.
Thirsk, John Bell.
Tiverton, J. Heathcoat, Lord Palmerston.
Totnes, B. Baldwin, Lord Seymour.
Tower Hamlets, Sir W. Clay, C. R. Fox.
Truro, E. Turner, J. E. Vivian.
Tynemouth, H. Mitcalfe.
Wakefield, Hon. W. S. Lascelles.
Wallingford, W. Blackstone.
Walsall, R. Scott.
Wareham, J. S. Drax.
Warrington, J. Ireland Blackburne.
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Westmoreland, Hon. H. C. Lowther, Ald. W. Thompson.
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Whitby, A. Chapman.
Whitehaven, M. Attwood.
Wigan, P. Greenall, C. Standish.
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Wiltshire (South), J. Benett, Hon. Sidney Herbert.
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Windsor, J. Ramsbottom, R. Neville.
Wolverhampton, Hon. C. P. Villiers, T. Thornely.
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Worcestershire (West), Hon. H. B. Lygon, F. W. Knight.
Worcester, J. Bailey, Sir T. Wylde.
Wycombe, G. H. Dashwood, R. Bernal, jun.
Yarmouth, C. E. Rumbold, W. Wilshere.
Yorkshire (E. R.), Lord Hotham, H. Broadley.
Yorkshire (W. R.), Hon. J. Stuart Wortley, E. Denison.
Yorkshire (N. R.), Hon. O. Duncombe, E. S. Cayley.
York, J. H. Lowther, H. R. Yorke.

SCOTLAND.

County Members, 30; Cities and Boroughs, 23 — Total, 53.

Aberdeen, County, Hon. Captain Gordon.
Aberdeen, A. Bannerman.
Andrew's, St., Cupar, &c., E. Ellice, jun.
Argyll, County, D. M'Neil.
Ayr, County, Alex. Oswald.
Ayr, &c., Lord James Stuart.
Banff, County, General Duff.
Berwick, County, Sir H. P. Campbell, Bt.
Bute, County, Hon. J. Steuart Wortley.
Caithness, County, G. Trail.
Clackmannan and Kinross, Gen. Morison.
Dumbarton, County, A. Smollett.
Dumfries, County, J. J. H. Johnstone.
Dumfries, &c., W. Ewart.
Dundee, G. Duncan.
Edinburgh, County, W. R. Ramsay.
Edinburgh, Rt. Hon. T. B. Macaulay, W. G. Craig.
Elgin and Nairn Counties, C. L. C. Bruce.
Elgin, &c., Sir A. Leith Hay.
Falkirk, &c., W. Baird.
Fife, County, Captain J. Wemyss.
Forfar, County, Lord J. F. Gordon.
Glasgow, J. Oswald, J. Dennistoun.
Greenock, R. Wallace.
Haddington, Co., Sir T. B. Hepburn, Bart.
Haddington, &c., J. M. Balfour.
Inverness, County, Hon. Jas. Baillie.
Inverness, Boroughs, Jas. Morrison.
Kilmarnock, &c., A. Johnston.
Kincardine, County, Hon. H. Arbuthnot.
Kirkaldy, &c., R. Ferguson.
Kirkcudbright, Alex. Murray.
Kirkwall, Wick, &c., J. Loch.
Lanark, County, M. Lockhart.
Leith, Rt. Hon. Andrew Rutherfurd.
Linlithgow, County, Hon. Cha. Hope.
Montrose, &c., J. Hume.
Orkney and Shetland, F. Dundas.
Paisley, A. Hastie.
Peebles, County, W. F. Mackenzie.
Perth, County, H. Home Drummond.
Perth, Rt. Hon. Fox Maule.
Renfrew, County, P. M. Stewart.
Ross and Cromarty Shires, T. Mackenzie.
Roxburgh, County, Hon. F. Scott.
Selkirk, County, A. Pringle.
Stirling, County, W. Forbes.
Stirling, &c., Lord Dalmeny.
Sutherland, County, David Dundas.
Wigton, County, Capt. J. Dalrymple.
Wigton, &c., J. M'Taggart.

IRELAND.

County Members, 64; Universities, 2; Cities and Boroughs, 39 — Total, 105.

Antrim, County, J. Irving, N. Alexander.
Armagh, County, Viscount Acheson, Col. W. Verner.
Armagh, Lt. Col. Rawdon.
Athlone, J. Collett.
Bandonbridge, Viscount Bernard.
Belfast, J. E. Tennent, D. B. Ross.
Carlow, County, H. Bruen, T. Bunbury.
Carlow, B. V. Layard.
Carrickfergus, P. Kirk.
Cashel, Dr. Stock.
Cavan, County, J. Young, Hon. J. P. Maxwell.
Clare, County, Major M'Namara, C. O'Brien.
Clonmel, Rt. Hon. David Richard Pigot.

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Coleraine, John Boyd.
Cork, County, E. B. Roche, D. O'Connell.
Cork, F. S. Murphy, D. Callaghan.
Donegal, County, Sir E. S. Hayes, Col. E. M. Conolly.
Down, County, Lord Castlereagh, Lord Hillsborough.
Downpatrick, D. Ker.
Drogheda, Sir W. Somerville, Bart.
Dublin, County, J. H. Hamilton, T. E. Taylor.
Dublin, City, W. H. Gregory, E. Grogan.
Dublin University, Rt. Hon. F. Shaw, G. H. Hamilton.
Dundalk, T. Redington.
Dungannon, Viscount Northland.
Dungarvon, Rt. Hon. R. L. Sheil.
Ennis, H. Bridgman.
Enniskillen, Hon. A. H. Cole.
Fermanagh, M. Archdall, Sir A. R. Brooke.
Galway, County, T. Martin, J. J. Bodkin.
Galway, M. J. Blake, Bart., Sir V. Blake.
Kerry, County, M. J. O'Connell, Hon. W. Browne.
Kildare, County, R. M. O'Ferral, G. Archbold.
Kilkenny, County, Hon. P. Butler, .
Kilkenny, J. O'Connell.
King's County, Col. J. C. Westenra, Sir A. Armstrong, Bart.
Kinsale, W. H. Watson.
Leitrim, County, Lord Clements, S. White.
Limerick, County, W. S. O'Brien, C. Powell.
Limerick, Sir D. Roche, Bart., J. O'Brien.
Lisburne, Captain Meynell.
Londonderry, County, Sir R. Bateson, Capt. T. Jones.
Londonderry, Sir R. A. Ferguson, Bart.
Longford, County, A. Lefroy, Col. H. White.
Louth, County, R. M. Bellew, Hon. T. V. Dawson.
Mallow, Sir C. D. O. Jephson Norreys.
Mayo, County, R. D. Browne, M. Blake.
Meath, Henry Grattan, M. E. Corbally.
Monaghan, County, E. P. Shirley, C. P. Leslie.
Newry, Viscount Newry.
New Ross, Hon. R. Gore.
Portarlington, Col. G. L. D. Damer.
Queen's County, Sir C. Coote, Hon. T. Vesey.
Roscommon, County, O'Conor Don, F. French.
Sligo, County, J. Ffolliott, W. R. O. Gore.
Sligo, J. P. Somers.
Tipperary, Hon. R. O. Cave, V. Maher.
Tralee, Maurice O'Connell.
Tyrone, County, Lord C. Hamilton, Hon. H. T. L. Corry.
Waterford, County, W. V. Stuart, Hon. R. S. Carew.
Waterford, W. Barron, T. Wyse.
Westmeath, County, B. J. Chapman, H. M. Tuite.
Wexford, County, James Power, V. F. Hatton.
Wexford, Sir Thos. Esmond, Bart.
Wicklow, County, Sir R. Howard, W Acton.
Youghall, C. Cavendish.

CORPORATION OF LONDON.

Lord Mayor, Right. Hon. William Magnay, Alderman for the Ward of Vintry.

Aldermen who have served the Office of Lord Mayor.

	Elected		Elected
Bridge Without...	Sir C.S. Hunter, Bt. 1804	Bishopgate	W. T. Copeland.... 1829
Billingsgate.....	A. Brown 1821	Farringdon Within,	T. Kelly 1830
Cheap...	W. Thompson..... 1821	Castle Baynard ...	S. Wilson..... 1831
Tower.....	M. P. Lucas..... 1821	Bridge Within	Sir C. Marshall ... 1833
Langbourne.....	Sir John Key, Bart. 1823	Portsoken	Thomas Johnson... 1833
Aldersgate	Sir Peter Laurie... 1826	Cornhill	Sir J. Pirie, Bt..... 1834
Lime Street.....	C. Farebrother.....1826	Aldgate.....	John Humphery... 1836

Aldermen who have not served the Office of Lord Mayor.

Cordwainers.....	T. Wood..... 1825	Bassishaw.....	Thomas Farncombe 1841
Walbrook.....	Mich. Gibbs 1838	Broad Street	John Musgrove... 1842
Dowgate	John Johnson 1839	Coleman Street.....	William Hunter... 1843
Candlewick.....	Sir G. Carroll..... 1840	Cripplegate.....	Thomas Challis.... 1843
Farringdon Without.	Sir James Duke 1840	Bread Street.....	Hughes Hughes... 1843
Queenhithe	J. K. Hooper 1840		

Sheriffs, Alderman Musgrove, and F. Graham Moon, Esq.
Under Sheriffs, Messrs. Anderton and Hopkinson.

Recorder, Hon. C. E. Law, M.P.
Common Serjeant, J. Mirehouse, Esq.
Judge of Sheriffs' Court, E. Bullock, Esq.
Chamberlain, Sir W. Heygate, Bart.
Town Clerk, Serjt. Merewether.
Solicitor, Chas. Pearson, Esq.
Commissioner of Police, D. W. Harvey, Esq.
Remembrancer, E. Tyrrel, Esq.

BANK OF ENGLAND.

Governor, William Cotton, Esq.
Deputy-Governor, John B. Heath, Esq.
Twenty-four other Directors.
Secretary, J. Knight, Esq.
Chief Cashier, M. Marshall, Esq

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